What is budgeting?

What are the advantages for a corporation from properly developed and administered budgets?

What are the first 5 characteristics of successful budgeting?

What are the second 5 characteristics of successful budgeting?

What are best practice guidelines for the budget process?

Define budgetary slack and explain how it impacts goal congruence.
When properly developed and administered, budgets provide the following advantages to the corporation:

1) Promote **coordination** and **communication** among organization units and activities,
2) Provide a **framework for measuring performance**, 
3) Provide a means for **controlling operations**, 
4) Provide a means to **check on progress** toward the organization’s objectives, 
5) Provide **motivation** for managers and employees to achieve the company’s plans, and 
6) Promotes the **efficient allocation of organizational resources**.

A budget is a plan expressed in quantitative (numerical) terms. The development of an annual budget for a large corporation may take many months to complete. This is because some budgets cannot be completed until other budgets have been completed.

There are a number of characteristics of successful budgeting. The second five examples include:

6) **Flexibility** exists to allow for changes in operating conditions that may occur after the budget is finalized.
7) The budget should be an **accurate representation** of what is expected to occur.
8) **Coordination** exists between operating activities of diverse business units
9) Budgeting should **not be rigid**. Management decision making should not be based upon the budget alone.
10) The **time period** for a budget should reflect the **purpose** of the budget.

There are a number of characteristics of successful budgeting. The first five examples include:

1) It **starts with the short- and long-term plans**.
2) **Support of management** exists at all levels.
3) A **sense of ownership** exists amongst people who are responsible for implementation.
4) The budget is viewed as a **motivating device to help everyone to do a better job**.
5) The budget is used to **take actions today to address possible future problems** that are anticipated in the firms strategic planning.

**Budgetary slack** is the difference between the budgeted performance and the performance that is actually expected. It is the practice of underestimating budgeted revenues and overestimating budgeted costs to make the overall budgeted profit more achievable.

**Goal congruence** is defined as “aligning the goals of two or more groups.” As used in planning and budgeting, it refers to the aligning of goals of the individual managers with the goals of the organization as a whole.

There is a hazard in the budgeting process. It may lead to behaviors on the part of managers that benefit them but are not congruent with the goals of the company. This is more likely to occur if managers’ performance will be evaluated based upon budget achievement. Managers who develop the budgets that they are going to be accountable to meet may build budgetary slack into their budgets in order to make sure their budgets are achievable. Sometimes, the performance of an individual manager’s unit will benefit from an action, but the overall performance of the company is either not impacted or is negatively impacted. When this disconnect occurs, it is because the goals of the individual managers are not aligned with company goals.

**Best practices guidelines for budgeting include:**

1) Linking the development of the budget to corporate strategy.
2) Extensive communication.
3) **procedures so that the budget results in strategic allocation of funding resources.**
4) ensuring that managers are evaluated on performance measures other than meeting budget targets.
5) Cost management efforts linked to budgeting.
6) Ensuring that the budget will result in strategic use of variance analysis.
7) Reduced complexity and budget cycle time.
8) Developing budgets that can be revised if necessary.
9) Reviewing the budget on a regular basis throughout the year.
What are the *budget manual* and *planning calendar*?

What is the *sequence* in which the different budgets are prepared?

What are a *flexible budget* and a *static budget*?

How do you *calculate* the *flexible budget amount*?

What are other types of budgets, such as *zero-base*, *life-cycle*, *activity-based*, and *continuous*?

What is the *control loop*?
The first budget to develop is the **sales budget**. After the sales budget is prepared the company can determine the **production budget**. This is followed by finished goods, inventory and the rest of the operating schedules (such as Direct Labor, Materials, Marketing and Selling expense, Administrative budgets, etc.), which together lead to the pro forma Income Statement. The above budgets are called **operating budgets**.

The **capital budget** (fixed assets) is prepared independently from the other budgets because it is long-term in nature.

All of the above converge in the **cash budget** (the last budget prepared) and the pro forma balance sheet. **Financial budgets** include the capital budget, cash budget and pro forma balance sheet.

Operating and financial budgets together form the **master budget**.

In some questions you will be given the master budget and asked to determine what the **flexible budget** would have been. In this type of question, you need to remember that the fixed costs will not change in total.

To calculate the fixed costs, multiply the master budget amount of production by the fixed costs per unit. This amount will not change, no matter the level of actual production.

After you have calculated the total fixed costs, you must address the variable costs. The variable cost per unit will not change as the level of output changed.

This question requires that you know the difference between how fixed and variable costs change.

**A budget manual** details the budget process. One of the areas that must be included in the budget manual is the communication and distribution process. As one budget is completed it must be sent to all of the departments whose budgets are based off of, or include, the previously completed budget.

**A planning calendar** is the document that sets forth all of the deadlines, policies and procedures of the budgeting process.

A **static budget**, or **fixed budget**, is a budget that is prepared for only one level of activity (a certain level of sales) within the company.

A **flexible budget** is one that includes what the budget would be for different levels of sales. This means that throughout and at the end of the period, the management of the company is able to compare the actual results with a budget that is indicative of the actual level of sales. In order to do this, a company will have to use a **standard cost system**.

When preparing actual to budgeted comparative reports, the flexible budget needs to be adjusted for the actual number of units before comparing the actual results to the budgeted amount.

The difference between the actual amount and the flexible budget amount is called the **flexible budget variance**.

**Zero-based budgeting** is the budgeting method in which the current year’s budget is prepared without any reference to, or use of, the prior period’s budget. This is opposed to **incremental budgeting** where there is a simple multiplying of the last year’s budget by a certain percentage.

**A life-cycle budget** follows a product through its entire life – from development through its decline.

**Activity-based budgeting** focuses on activities that drive costs to be incurred. This is like activity-based costing, but done at the budgeting stage.

**Governmental budgeting** is done for governments and has the power of law. Spending in excess of the budget requires new legislation.

**A continuous budget** is automatically prepared for a certain period of time ahead of the present. For example, a 1-year continuous budget will be prepared at the end of every month for the next 12 months.
How do you calculate the number of units to produce or purchase?

What are the two basic forecasting methods?

What are the four patterns that a time series can have that influence its behavior (i.e., the four different types of time series)?

What are the two ways in which time series methods are used in forecasting?

What are a moving average and a weighted moving average as used in forecasting?

What is exponential smoothing and when is it useful for forecasting?
The two basic forecasting methods are:

1) **Time Series** methods, which look only at the historical pattern of one variable and generate a forecast by extrapolating the pattern; and

2) **Causal Forecasting** methods, which look for a cause-and-effect relationship between the variable we are trying to forecast (the dependent variable) and one or more other variables (the independent variables).

In order to calculate the number of units to purchase or produce during the period, use the following formula:

\[
\text{Units needed to make or purchase this period} = \text{Units needed for use in the current period} + \text{Units needed for next period’s beginning inventory (ending inventory)} - \text{Units on hand at the start of this period (beginning inventory)}
\]

This can also be used for periods longer than a month, though most questions are about a month. It may also be used for finished goods or for raw materials in the production process.

The four patterns a time series can take are:

1) **Trend** – A gradual shifting to a higher or lower level. Example: long-term sales growth.

2) **Cyclical** – Data fluctuates greatly from year to year due to cyclical factors such as the cyclical nature of the economy.

3) **Seasonal** – Fluctuations in a time series due to seasonality in the business. Seasonal fluctuations can take place within any time period that is less than one year in length. Even fluctuations within a day are considered seasonal (within-the-day seasonal component).

4) **Irregular** – Fluctuations that are caused by short-term, nonrecurring factors. The irregular component’s impact on a time series cannot be predicted.

**Exponential smoothing** is a special type of weighted moving average. The value for the next period is forecasted using the most recent period’s actual value and the most recent period’s forecasted value that has been forecasted using exponential smoothing.

The most recent period’s actual value and the most recent period’s forecasted value are each weighted, with their total weights being equal to 1. This weighted average becomes the next period’s forecast.

Exponential smoothing as a forecasting technique is most useful when the time series is stable, without many fluctuations.

**A moving average** is the average of the most recent data in the time series. A four-week moving average of sales is the average of the sales each week for the most recent four weeks. Each time a new value becomes available, it replaces the oldest value.

**A weighted moving average** is a moving average that uses different weights for each value. For example, more recent historical values might be given more weight than those given to older values.
What are the advantages and disadvantages of using exponential smoothing for forecasting?

Under what circumstances is trend projection most appropriate for forecasting?

What are the two assumptions in trend projection used for forecasting?

What is the coefficient of correlation, \( r \), and what is it used for?

What is the equation of a simple linear regression trend line?

What is the coefficient of determination, \( r^2 \), and what is it used for?
Trend projection using simple regression analysis is most appropriate when a time series is increasing or decreasing consistently.

The advantages of exponential smoothing are:
1) It is inexpensive because it does not require a lot of historical data. It requires only the current period’s actual and the current period’s forecast, so data storage requirements are minimized.
2) It is a simple concept.
3) It is quite powerful because of its weighting process.

The disadvantages of exponential smoothing are:
1) The forecast will lag if the trend increases or decreases over time.
2) It does not account for dynamic changes that occur.
3) Its forecasts require constant updating to respond to new information.
4) Its usefulness is limited, because it is most useful when the time series is stable, without many fluctuations.

The coefficient of correlation, $r$, is a numerical measure that measures both the direction (positive or negative) and the strength of the linear association between the value of $x$ and the value of $y$. It shows how closely connected the variables are and the extent to which a change in one variable has historically resulted in a change in the other variable. It is always a number between −1 and +1. The coefficient of correlation is used to determine whether trend projection would be a meaningful way to determine a forecast.

The two assumptions in using simple linear regression analysis to make a trend projection are:
1) Variations in the dependent variable (what we are forecasting) are explained by variations in one single independent variable (i.e., time, in a time series).
2) The relationship between the independent variable and the dependent variable is linear and thus will graph as a straight line.

The coefficient of determination, $r^2$, is the square of the coefficient of correlation. It represents the percentage of the total amount of change in the dependent variable (the $y$ value of each point on the regression line) that can be explained by changes in the independent variable (the $x$ value).

$R^2$ is expressed as a number between 0 and 1. In a regression with a high $r^2$, the data points will all lie close to the trend line. In a regression with a low $r^2$, the data points will be scattered above and below the trend line. An $r^2$ above .50 would indicate that the forecast yielded by simple linear regression analysis (trend projection) should be meaningful.

The equation of a simple linear regression line is:
$$\hat{y} = ax + b$$

Where:
$\hat{y}$ = the predicted value of $y$ on the regression line corresponding to each value of $x$
a = the slope of the line
b = the $y$ intercept, or the value of $y$ when $x$ is 0
$x$ = the value of $x$ on the $x$ axis that corresponds to the value of $y$ on the trend line
What formulas are used to convert a nominal value to a real value and a real value to a nominal value?

What is causal forecasting and when is it used?

What are the benefits of linear regression analysis in forecasting and budgeting?

What are the limitations of linear regression analysis in forecasting and budgeting?

What is the function of learning curves and why are they important?

What is the cumulative average-time learning model?
Causal forecasting uses a projection of some other value to determine a value we are forecasting. Causal forecasting is used when there is an identified cause and effect relationship between the value we are forecasting and some other value.

To find a real value when you have a nominal value and the inflation rate:

\[
\text{Real Value} = \frac{\text{Nominal Value}}{1 + \text{Inflation Rate}}
\]

To find a nominal value when you have a real value and the inflation rate:

\[
\text{Nominal Value} = \text{Real Value} \times (1 + \text{Inflation Rate})
\]

When the real value needed is a percentage rate, such as real rate of sales growth, and when you have the nominal rate and the inflation rate:

\[
\text{Real rate} = \frac{1 + \text{Nominal Value}}{1 + \text{Inflation Rate}} - 1
\]

To calculate the nominal rate when you have the real rate and the inflation rate:

\[
\text{Nominal rate} = \left(\frac{\text{Real rate} + 1}{\text{Inflation rate} + 1}\right) - 1.0
\]

Limitations, or shortcomings, of regression analysis are:

1) Regression analysis requires historical data. If historical data is not available, regression analysis cannot be used.
2) Even when historical data is available, if there has been a significant change in conditions, the use of past data is questionable for predicting the future.
3) In causal forecasting, the usefulness of the forecast depends upon the choice of the independent variable. An inappropriate choice can lead to misleading results.
4) Statistical relations developed using regression analysis are valid only for the range of data in the sample.

Benefits, or advantages, of regression analysis are:

1) Regression analysis is a quantitative method and thus it is objective. A given data set generates a specific result, and that result can be used to draw conclusions and make forecasts.
2) In budgeting, it is the only way to compute fixed and variable portions of costs that contain both fixed and variable components (i.e., mixed costs).

The cumulative average-time learning model assumes that each time the cumulative quantity of units produced doubles, there will be a constant percentage of decline in the average time per unit required for the entire (cumulative) amount produced.

If a plant is subject to an 80% learning curve, and the time required to build the first unit is 10 hours, then the total time required to build 2 units will be 10 hours × (2 × .80), or 16 hours. This works out to an average of 8 hours per unit; however, the first unit will have taken 10 hours and the second unit only 6 hours.

After 4 units have been built, the total time required to build 4 units will be 10 × (2 × .80)², or 25.6 hours. Thus, the first unit took 10 hours; the second unit took 6 hours, and the third and fourth units took a total of 9.6 hours, or only 4.8 hours each.

Learning curves describe the fact that the more experience an individual has with something, the more efficient he or she becomes in doing that task.

The concept of learning curves is important because it means that higher costs per unit should be expected early in production as part of start-up costs, and the costs per unit should be expected to decline over time, up to a point. There is a limit as to how fast or efficiently something can be done, and so the learning curve is not something that continues indefinitely. The rate of productivity improvement declines over time until it reaches a level where it remains, until another change in production occurs.
What is the *incremental unit-time learning model*?

What are the *benefits* of learning curve analysis?

What are the *limitations* of learning curve analysis?

What is *probability* and what is it used for?

What are the *two basic requirements* of probability?

What is *conditional probability*?
The **benefits of learning curve analysis** are that it can be used in making decisions such as:

1) Make or buy decisions, to analyze the cost.
2) Life-cycle costing, in calculating the cost of a contract over the life of the contract.
3) In cost-volume-profit analysis, to determine a more accurate breakeven point.
4) In development of standard costs, to adjust labor costs for learning in recognition of the fact that learning causes standard costs to change over time.
5) In capital budgeting, to project costs more accurately over the life of the capital investment.
6) In development of production plans and labor budgets.
7) In evaluation of management, to recognize that higher costs will occur in the early phase of a product’s life cycle.

The **incremental unit-time learning model** assumes that each time the cumulative quantity of units produced doubles, the time needed to produce the last unit (incremental unit time) declines by a constant percentage.

If the learning curve is 80% and the time required to build the first unit is 10 hours, then the time required to manufacture the second unit will be .80 * 10, or 8 hours. Thus, the total time required to produce the two units will be:

$$10 + 8 = 18 \text{ hours.}$$

The average time per unit will be $18 \div 2 = 9 \text{ hour}$.

The **limitations of learning curve analysis** are:

1) It is only appropriate for labor-intensive operations involving repetitive tasks where repeated trials improve performance. If the process uses robotics and computer controls, there is little repetitive labor and little opportunity for learning to take place.
2) The learning rate is assumed to be constant. However, in actuality, the decline in labor time may vary.
3) The reliability of the learning curve calculation can be jeopardized because an observed change in productivity might actually be associated with factors other than learning. It might be due to a change in the labor mix, a change in the product mix, or other factors. If so, a learning model that uses historical data would produce inaccurate estimates of labor time and cost.

**Probability** provides a means of measuring numerically how likely it is that an event will occur. Probability is important in decision-making because it is a numerical measurement that enables us to quantify and analyze uncertainties.

Probability is expressed as a value between 0 and 1. The closer the probability is to 0, the less likely it is that the event will occur, and a probability of 0 means there is no chance that it will occur. A probability near 1 means the event is almost certain to occur, and a probability of 1 means it is absolutely certain to occur.

**Conditional probability** is the probability of a second event occurring given that a first event has already occurred.

The **two basic requirements of probability** are:

1) The probability values assigned to each of the possible outcomes must be between 0 and 1, and
2) The probable values assigned to all of the possible outcomes must total 1.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is joint probability?</td>
<td></td>
</tr>
<tr>
<td>What are mutually exclusive events?</td>
<td></td>
</tr>
<tr>
<td>What are the three methods used to assign probabilities?</td>
<td></td>
</tr>
<tr>
<td>What is a random variable and what is a discrete random variable?</td>
<td></td>
</tr>
<tr>
<td>What is a continuous random variable?</td>
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<tr>
<td>What is the expected value of a discrete random variable and how is it calculated?</td>
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</tr>
</tbody>
</table>
If the occurrence of one event means that another event cannot occur, the two events are said to be **mutually exclusive**. The probability of one of the mutually exclusive events happening is the chance of each of the events individually added together.

The **joint probability** of two events occurring is the probability that they will both occur together. The joint probability of two independent events is calculated as the probability of the first event multiplied by the probability of the second event.

To put it another way, the probability of the first event multiplied by the **conditional probability** of the second event equals the joint probability of both events occurring.

The probability of one out of two mutually exclusive events occurring is the probabilities of each of the events individually added together.

The probability of at least one, and maybe both, of two independent events occurring is the sum of their individual probabilities minus their joint probability.

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A **random variable** is a variable that can have any value within a range of values that occurs randomly and can be described using probabilities.

A **discrete random variable** is a random variable that can take on the value of any integer, i.e., any whole number, such as the number of people coming into a store or the number of computers sold in a day’s time.

A discrete random variable cannot take on a fractional value.

1) The **classical method** assumes that every possible outcome has an equal probability of occurring. The classical method is seldom used in situations of business uncertainty.

2) The **objective**, or **relative frequency**, method is used when factual information is available that can be used to determine the probability of something occurring. The information may come from sample data or any other reliable source.

3) The **subjective method** is used when factual information is not available and the possible outcomes are not equally likely. Using whatever data is available and our own experience and intuition, we assign a probability for each possible outcome that expresses our degree of belief that the outcome will occur.

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The **expected value** is the mean or average of the values of the random variable. When we are working with probabilities, it is a weighted average of all the possible values of the random variable, with the probabilities for each of the values used as the weights.

It is calculated by multiplying each possible outcome by its probability and then summing all the products.

A **continuous random variable** can take on any value whatsoever within an interval or a collection of intervals. It can be either a whole number or a fractional value, whereas a discrete random variable can only be a whole number.
What is the variance of a probability distribution?

What is the standard deviation of a probability distribution and how is it interpreted?

What is a normal probability distribution?

What is the difference between risk and uncertainty?

What are the measures used to express the likely result of a decision that involves risk and uncertainty?

What is the coefficient of variation and how is it calculated?
The standard deviation of a probability distribution is one of the two ways that the variability of the possible values for the random variable is expressed (the other way is the variance). The standard deviation is the positive square root of the variance.

In a normal distribution:
1) 68% of the actual values are expected to lie within one standard deviation from the mean, or expected value. That means one standard deviation represents a probability of about 68% that an actual observation will fall within the interval of the amount of one standard deviation on either side of the mean.
2) 95% of the actual values are expected to lie within two standard deviations from the mean.
3) 99.7% of the actual values are expected to lie within three standard deviations from the mean.

The variance of a probability distribution is one of the two ways that the variability of the possible values for the random variable is expressed (the other way is the standard deviation).

The variance is the sum of the squares of all the differences (deviations) from the mean (average), with each squared deviation weighted according to its probability. Thus the variance is actually a weighted average of the squared deviations with the probabilities as the weights. This difference from the mean of each result tells us how far any particular measurement is (on average) from its expected value.

Risk in investing is the possibility that an investment’s actual return will differ from its expected return. Risk for a security can be measured by the variability of its historical returns or the dispersion of its historical returns around their average, or mean, return. Thus, risk for an investment is measured by the variance and the standard deviation of its returns.

Uncertainty is risk that cannot be measured. If there is no historical data to use for developing information to estimate probability and thus expected return, we are in the position of decision-making under a condition of uncertainty. When this is the case, the probability distribution of possible returns must be determined subjectively.

The graph of a normal probability distribution has the form of a symmetrical bell-shaped curve that is centered on its mean as follows:
1) 68% of the values lie within one standard deviation.
2) 95% of the values lie within two standard deviations.
3) 99.7% of the values lie within three standard deviations of the mean.
A larger mean causes the top of the curve to be higher. A larger standard deviation causes the curve to be flatter and broader because the dispersion of the data about the mean is greater.

For a normal distribution, the area under the curve for any interval is the probability that the random variable will take on a value in that interval. The total area under a normal distribution curve equals 1. Probabilities are computed by finding the area under the curve for the interval in question.

The coefficient of variation is a measure of risk per unit of expected return. It compares the amount of the variation in expected returns with the amount of the expected return.

Using the expected return expressed as a rate of return, the coefficient of variation is:

\[
\text{Coefficient of variation (CV)} = \frac{\sigma}{\text{Expected Return}}
\]

The higher the coefficient of variation is, the riskier the investment is.

For decisions involving risk and uncertainty, we use expected value or expected return to express the most likely result of our decision. And we use the standard deviation of the probability distribution of the potential returns as a measurement of the risk associated with the decision.

By expressing differences from the expected return in terms of standard deviation, we can state the probability that the actual return will be greater than or less than the expected return. The greater the standard deviation, the greater the potential for great loss or great gain.
What is the mean as a measure of central tendency of a set of numbers?

What is the median as a measure of central tendency of a set of numbers?

What is the mode as a measure of central tendency of a set of numbers?

What do measures of dispersion, such as variance and standard deviation, indicate?

How is the variance of a set of measurements calculated?

How is the standard deviation of a set of measurements calculated?
The **median** is the halfway value if raw data is arranged in numerical order from lowest to highest. Thus, half the values are smaller than the median and half of the values are larger than the median.

Example: For a set of numbers: 1, 1, 3, 6, 7, the median is 3 (half of the values are above it and half are below).

The **mean** is the arithmetic average of a set of numbers. It may also be a weighted average.

The mean of a sample is often represented with a bar over the letter for the variable. The mean of a population is often represented by the Greek letter mu (μ).

Example: For a set of numbers: 1, 1, 3, 6, 7, the mean is \((1 + 1 + 3 + 6 + 7) ÷ 5\) or 3.6.

**Measures of dispersion** such as variance and standard deviation indicate the amount of variation within a set of numbers with respect to the mean of those numbers.

The **mode** is the most frequently occurring value in a group of numbers. If all values are unique (different from each other), no mode exists.

Example: For a set of numbers: 1, 1, 3, 6, 7, the mode is 1 (the most frequently occurring value).

The **standard deviation** of a data set is the square root of the variance. It is a measure of how close together all of the items in the population are to the population’s mean. A population in which all of the values are very close to the mean will have a low standard deviation.

The formula to calculate the standard deviation of a data set is the square root of the formula for the variance.

\[
s = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (x_i - \mu)^2}
\]

Where
- \(N\) = the number of elements in the population.
- \(\mu\) = the population mean.
- \(x_i\) = i-th element of the set.

The **variance** is the average of the squared deviations from the mean of a set of data. The variance of a population is represented by the lowercase Greek letter sigma squared. The formula for the variance of a set is:

\[
s^2 = \frac{1}{N} \sum_{i=1}^{N} (x_i - \mu)^2
\]

Where
- \(N\) = the number of elements in the population.
- \(\mu\) = the population mean.
- \(x_i\) = i-th element of the set.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How is the <em>expected value</em> of perfect information calculated?</td>
<td></td>
</tr>
<tr>
<td>What is <em>sensitivity analysis</em>?</td>
<td>Define and explain the concept of <em>proforma financial statements</em>.</td>
</tr>
<tr>
<td>What is <em>sensitivity analysis</em> used for and in what situations is it useful?</td>
<td></td>
</tr>
<tr>
<td>What are the <em>five primary internal uses</em> for pro forma financial statements?</td>
<td>List and explain the <em>3 primary approaches</em> to financial forecasting.</td>
</tr>
</tbody>
</table>
**Sensitivity analysis** is a variety of techniques used to determine how an amount will change if one variable in the analysis is changed. If a small change in the value of one of the inputs would cause a change in the recommended decision alternative, then the solution to the decision analysis problem is **sensitive to that input**, and we can take extra care to make sure that the assigned value to that input in the analysis is as accurate as possible because of the greater risk.

If changing a particular input makes no difference in the recommended decision alternative, then the solution is **not sensitive to that input**, and it is not necessary to spend extra effort ensuring that the value assigned to that input in the analysis is accurate.

When used with decision trees and expected values, different values are selected for the various probabilities and payoffs and they are changed one at a time to see how the recommended decision alternative changes.

The **expected value** of perfect information is the difference between the expected payoff we could receive if we had perfect information about the future, and the expected payoff we can receive by using our best analytical decision-making skills, but without perfect information about the future.

In business, the term pro forma is used to describe some kind of data, usually financial statements, where the data is on an "as if" basis, i.e., as if something in particular had happened. **Pro forma financial statements** are prepared for internal use in the process of planning. They are financial statements containing projected amounts that are expected if a particular course of action is followed. Pro forma financial statements are often used to evaluate what the effect will be on the company’s finances if a particular sales forecast is realized, although they can be used for other "what if" scenarios as well.

**Sensitivity analysis** is particularly helpful when there is a great deal of uncertainty about the various inputs to a decision model.

1) "What-if” analysis using the contribution margin and contribution margin ratio.
2) In linear programming to change assumptions regarding the coefficients in the objective function and to make changes to the right side of a constraint function to see how the changes would affect the optimal solution.
3) Determining the margin of safety, which is the amount by which sales can decline without causing a loss.
4) Determining operating leverage.
5) Cash flow budgeting, using different assumptions about selling prices and direct material costs.
6) Developing expected values for cash flows to be used in capital budgeting.

Various approaches to financial forecasting are used, depending upon the situation. The three primary approaches used are:

1) **Experience** – Because sales, expenses or earnings have grown at a particular rate in the past, we assume they will continue growing at that rate in the future. This leads to trend projections.
2) **Probability** – We assume something will happen in the future because the laws of probability indicate it will. For example, probability is used to forecast the expected value of future cash flows from a proposed capital budgeting project.
3) **Correlation** – Because there has been a high correlation in the past between one factor and another factor, such as increased advertising leading to increased sales, we use what we know about the first factor to forecast the second factor.

Pro forma financial statements are used internally for five general purposes:

1) To compare the company’s anticipated performance with its target performance and with investor expectations.
2) To perform “what if” analysis, to forecast the effect of a proposed change.
3) To determine in advance what the company’s future financing needs will be.
4) To prepare various cash flow projections and sets of pro forma statements using different assumptions for different operating plans. They are used to forecast the capital requirements of the plans in order to select the plan that maximizes shareholder value.
5) To determine whether the company will be able to remain in compliance with the required financial statement covenants on its long-term debt.
Why does a company need additional funds when its sales increase?

What are the three sources of funding for increases in assets that are required to support increased sales?

Explain the concept spontaneous liability increase as a source of funding for the increased assets required to support increased sales.

What are the factors that determine a company’s need for external financing?

Explain the forecasted financial statement (FFS) concept as a method to analyze the need for external financing.

What are the four steps when preparing a set of pro forma financial statements in order to forecast future financing needs using the forecasted financial statements method?
The three sources of funding for increases in assets required to support increased sales are:

1) Spontaneous liability increases;
2) Increased profits from the increased sales over and above any of the increased profits that are paid out in dividends (i.e., additional retained earnings);
3) External financing;

When a company’s sales increase, more inventory will be needed to support the increased sales. Accounts receivable will increase, and the company may need to purchase new equipment to increase its production. These are all costs that result from increased sales, and additional funds are needed to support these increases.

The factors that determine the amount of external financing a company will need are:

1) The company’s rate of sales growth. The higher the company’s growth rate in sales, the greater its need for external financing.
2) The company’s capital intensity ratio, or the amount of assets required per dollar of sales. The higher the capital intensity ratio, the greater the need for external financing.
3) The company’s spontaneous liabilities-to-sales ratio. The lower the ratio, the greater will be the need for external financing.
4) The company’s profit margin. The lower the profit margin, the greater need the company will have for external financing.
5) The company’s retention ratio. The lower the retention ratio, the greater the need for external financing.
6) Planned changes in policies and procedures, such as changes in accounts receivable terms offered to customers or changes in terms received from vendors.

When inventory increases, accounts payable also will increase because more inventory is being purchased and/or manufactured. Accrued liabilities (accrued salaries and wages, accrued taxes, etc.) will also increase because of the increased activities. These are called spontaneous liability increases because they occur naturally.

Note: borrowed funds, i.e., bank loans and bonds issued, are not liabilities that increase spontaneously. The company needs to do something intentional to cause its borrowings to increase, for instance request a bank loan or issue bonds; so borrowed funds to not increase spontaneously.

The four steps to follow when preparing a set of pro forma financial statements in order to forecast future financing needs are:

1) Analyze historical ratios that will be used for the projections.
2) Forecast sales and the pro forma income statement.
3) Forecast the pro forma balance sheet, including the need for additional external financing which will be a “plug.”
4) Construct a pro forma statement of cash flows.

The forecasted financial statement approach forecasts a complete set of pro forma financial statements, including an income statement, balance sheet, and statement of cash flows.

Required increases in assets (accounts receivable, inventory) and in spontaneous liabilities (accounts payable, accrued liabilities) as a result of the increased sales are included in the pro forma balance sheet.

All of the sources of financing are forecasted, including existing debt and equity. The increase in retained earnings is forecasted by forecasting the entire income statement and the dividend payments.

The difference between total assets and total liabilities and equity when all this has been completed is the additional funds needed, which is a “plugged” figure on the balance sheet.
Why is an analysis of forecasted financial statements necessary?

Define the formula for the current ratio.

Define the formula for the inventory turnover ratio.

Define the formula for the receivables turnover ratio.

Define the formula for the days sales in receivables ratio.

Define the formula for the interest coverage ratio.
The pro forma financial statements need to be analyzed to determine whether the firm’s forecasted financial situation meets the firm’s targets. If it does not, then changes will be needed, not just to the forecast but to the operating plans that resulted in the forecast, and the pro forma statements will need to be done again.
Define the formula for the \textit{asset turnover ratio}.

Define the formula for the \textit{debt ratio}.

Define the formula for the \textit{profit margin ratio}.

Define the formula for the \textit{return on assets ratio}.

Define the formula for the \textit{return on equity ratio}.

Define the formula for the \textit{return on invested capital ratio}.
Total liabilities / Total assets

Net sales / Total assets

Net income¹ / Total assets

¹ Net income = Net income before preferred dividends

Net income¹ / Net sales

¹ Net income = Net income before preferred dividends

NOPAT¹ / Total operating capital²

¹ NOPAT (Net Operating Profit After Tax) = EBIT (1 – tax rate)

² Total operating capital = Cash + Accounts receivable + Inventories – Accounts Payable – Accruals + Net plant and equipment.

Net income¹ / Total equity

¹ Net income = Net income before preferred dividends
What is a *standard cost*?

Describe a *standard cost system* and explain reasons for using it.

Define *process costing*, *job order costing*, and explain the *difference* between the two systems.

What are the *levels of activity* to use in standard cost calculations?

What are five possible *sources of information* for the development of *standard costs*?

What is the difference between a *target price* and a *target cost*?
A standard cost system is an accounting system that uses standard costs and standard cost variances in the formal accounting system. Reasons for adopting a standard cost system include:

1) Simpler to use standard costs in a process costing system because of the repetitive nature of the operation.
2) Easier to determine cost per equivalent unit in a process cost system, because the standard costs serve as the cost per equivalent unit for direct materials, direct labor, and manufacturing overhead.
3) Simplifies recordkeeping in either a process costing system or a job-order costing system. Records need to be kept only for quantities on hand. The cost associated with those quantities is simply the standard cost for the period.

A standard cost is an estimate of the cost that the company expects to incur in the production process. It is calculated at the beginning of the year. The per unit standard cost is based on the estimated costs and the expected level of activity or production for the period. A comparison of actual costs to standard costs allows the company to analyze their actual costs and also enables the company to establish some forms of controls over the costs. Without a standard that is to be achieved, controls are not possible because nobody knows what is supposed to be happening.

The levels of activity used are:

**Theoretical or ideal level** of output assumes no breakdowns, no waste, no time lost to illness and that the workers are already working at maximum efficiency.

**Practical (or currently attainable) level** of output is the level that will be achieved given the normal amount of time lost, normal amount of waste and a normal learning curve for employees. Variations in sales demand are not taken into account.

**Normal level** is an average expected level of production within the time frame of several years (up to 3) given reasonable expectations of effective and efficient production and customer demand. This is the level that should generally be used for planning purposes.

**Expected actual utilization (master budget)** capacity is the planned capacity for the next budget period. A company may use one of the above levels of output, or a different number.

A process costing system is used to assign costs to individual products when the products are all relatively similar and are mass-produced, as on an assembly line.

**Job-order costing** is a method in which all of the costs associated with a specific job (or client) are accumulated and charged to that job (or client). This system is most appropriate for production of custom built finished goods that are built based upon unique customer requirements.

The target price is the market price for a given product. The market determines the target price. The company then decides what its target cost needs to be in order to realize its desired profit margin for the product.

The company must figure out how it can manufacture the product for its target cost. It must attain this target cost if it is going to realize its desired profit margin for the product.

Five possible sources of information for standard cost development include:

1) **Activity analysis** involving identifying, delineating or outlining, and evaluating all the activities necessary to complete a job, a project or an operation.
2) **Historical data.**
3) **Benchmarking** based on current practices of similar operations in other firms.
4) **Target costing** based upon the market and the price for which the product can be sold.
5) **Strategic decisions** by company management.
What is the total static budget variance?

Define favorable and unfavorable variances for variance analysis purposes.

What are the total flexible budget variance and the total sales volume variance?

What are the direct input (materials and labor) total variances and subvariances, and how are they calculated?

Define the primary accounting requirements for direct material variances in a standard costing system.

Define the primary accounting requirements for direct labor variances in a standard costing system.
A **favorable variance** is a variance that causes actual net operating income to be higher than the budgeted amount.

An **unfavorable variance** is a variance that causes actual net operating income to be lower than the budgeted amount.

For example, actual revenue that is below budgeted revenue is a negative variance because actual is lower than budget. That is unfavorable because it will cause actual net operating income to be lower than the budgeted amount. On the other hand, actual expenses that are below budgeted expenses are also negative variances, because actual is lower than budget, but they are favorable variances because they will cause actual net operating income to be higher than the budgeted amount.

The **total static budget variance** simply compares the static (master) budget against the actual results.

While this tells us whether we performed better or worse than budgeted, it does not provide any information as to why that has happened.

The total static budget variance is then further broken down into two subvariances – the **total flexible budget variance** and the **total sales volume variance**.

The **total variance** for direct materials or direct labor is the difference between the actual direct materials costs for the period and the standard costs for the standard amount of materials at the standard price per unit for the level of output actually produced (the flexible budget).

The total variance is broken down into two subvariances, calculated as follows:

\[
\text{Price Variance} = (\text{AP} - \text{SP}) \times \text{AQ}
\]

\[
\text{Quantity Variance} = (\text{AQ} - \text{SQ}) \times \text{SP}
\]

Where:
- **AP** = Actual Price
- **SP** = Standard Price
- **AQ** = Actual Quantity
- **SQ** = Standard Quantity

The production payroll is recorded by debiting Work-In-Process Inventory for the total number of **standard hours for the units manufactured** at the **standard hourly rate**. The credit is to accrued payroll at the **actual number of hours actually spent** and at the **actual hourly rate**. The difference is recorded in the Direct Labor Rate Variance (the price variance) and the **Direct Labor Efficiency Variance** (the quantity variance) accounts. Unfavorable variances are debits, and favorable variances are credits.

The variances are closed out at the end of the period, either to Cost of Goods Sold or, if they are material, prorated among Work-In-Process Inventory, Finished Goods Inventory, and Cost of Goods Sold.

The **total flexible budget variance** is the difference between the actual results and the flexible budget.

The **total sales volume variance** is the difference between the flexible budget and the static budget.

These two variances added together will equal the total static budget variance.

Standard costing systems use actual variance accounts to record the variances from the standard costs as they occur:

1. Purchases of direct materials are recorded as debits to the Materials Inventory account at their **standard cost**. If the company recognizes price variances at the time of purchase, any price difference versus standard is recorded in a Direct Materials Purchase Price Variance account. The credit is to Accounts Payable.

2. When direct materials are requisitioned from materials inventory for use in the production process, the debit to Work-In-Process Inventory is for the **standard quantity** of materials that should have been used for manufacturing the units manufactured, at their **standard cost**. The credit to the Materials Inventory account is for the **total amount of materials actually used**, at their **standard cost**. The difference is the direct materials quantity variance, and it is recorded in the Direct Materials Quantity (or Usage) Variance account.

At the end of the period, the variances are closed out to cost of goods sold (COGS) or, if material, prorated among COGS and inventories.
How are the total price and quantity variances calculated when there is more than one material input or more than one class of labor used in the production process?

What are the mix and yield variances and how are they calculated?

What is the total variable overhead variance and how is it calculated?

What are the variable overhead subvariances and how are they calculated?

What is the total fixed overhead variance and how is it calculated?

What are the fixed overhead subvariances and how are they calculated?
When more than one material input and/or more than one class of labor is used in the production process, the **quantity variances** for materials and labor are broken down into the **mix variance** and the **yield variance**.

**Mix variance** results when the mix of material used was different from the mix that should have been used.

\[
\text{Mix Variance} = (\text{WASPAM} - \text{WASPSM}) \times \text{AQ}
\]

The **yield variance** results from the difference between the total quantity of the inputs that were actually used to produce the actual output and the standard quantity that should have been used to produce the actual output.

\[
\text{Yield Variance} = (\text{AQ} - \text{SQ}) \times \text{WASPSM}
\]

**WASPAM** = Weighted Average Standard Price-Actual Mix  
**WASPSM** = Weighted Average Standard Price-Standard Mix  
**AQ** = Actual Quantity  
**SQ** = Standard Quantity

When a company uses more than one material input and/or more than one class of labor input in the production process, the total price and quantity variances are determined by calculating the price and quantity variances for each individual input separately, and then adding them together.

The **variable overhead spending variance** (a price variance) is related to the difference between the actual variable overhead cost per unit (this is calculated as the actual overhead costs ÷ the actual usage of the allocation base) and the standard application rate.

\[
\text{Variable OH Spending Variance} = (\text{AP} - \text{SP}^1) \times \text{AQ}
\]

The **variable overhead efficiency variance** (a quantity variance) is the amount of the total variance caused by a different usage of the allocation base than was expected (for example, the standard hours for the actual output).

\[
\text{Variable OH Efficiency Variance} = (\text{AQ} - \text{SQ}) \times \text{SP}^1
\]

¹Note that this is really not a price, but rather a rate. We use the letter P in this formula to keep it the same as in the materials and labor variances since the formulas are essentially the same.

The total fixed overhead variance is broken down into the fixed overhead volume variance and the fixed overhead budget/spending variance.

**Fixed overhead spending (budget) variance** - the difference between the actual fixed overhead costs and the budgeted fixed overhead amount.

\[
\begin{align*}
\text{Actual Fixed Overhead Incurred} & - \text{Budgeted Fixed Overheads (from the static budget)} \\
& = \text{Fixed Overhead Budget/Spending Variance}
\end{align*}
\]

**Fixed overhead production volume variance** - the difference between the budgeted amount of fixed overhead and the amount of fixed overhead applied (standard rate × standard input for the actual level of output).

\[
\begin{align*}
\text{Budgeted Fixed Overheads (from the static budget)} & - \text{Applied amount of Fixed Overhead} \\
& = \text{Fixed Overhead Volume Variance}
\end{align*}
\]

The **total fixed overhead variance** analysis is the difference between the actual fixed overhead incurred and the standard variable overhead applied. The standard variable overhead applied is based on the **standard usage given the actual output** of the overhead allocation base (machine hours, direct labor hours, etc). This is also called the **variable overhead flexible budget variance**.

\[
\begin{align*}
\text{Actual Total Variable Overhead Incurred} & - \text{Flexible Budget Amount}^1 \\
& = \text{Total Variable Overhead Variance}^2
\end{align*}
\]

¹This is calculated as (Standard Rate × Standard Quantity for the Actual Production Level).  
²Note that this is the same as the amount of over- or underapplied variable overhead.

The total fixed overhead variance is equal to the difference between the actual variable overhead incurred and the standard variable overhead applied. The standard variable overhead applied is based on the **standard usage given the actual output** of the overhead allocation base (machine hours, direct labor hours, etc). This is also called the **variable overhead flexible budget variance**.

\[
\begin{align*}
\text{Actual Fixed Overhead Incurred} & - \text{Applied Fixed Overheads} \\
& = \text{Total Fixed Overhead Variance}^1
\end{align*}
\]

¹Note that this amount is the same as the over- or underapplied fixed factory overhead.
How are the *two-way*, *three-way* and *four-way* variance analyses calculated?

How is the *sales price variance* calculated when only *one product is sold*?

How is the *sales volume variance* calculated when only *one product is sold*?

How is the *sales price variance* calculated when *more* than one product is sold?

How is the *sales volume variance* calculated when more than one product is sold, what are the two *subvariances* within it, and how are they calculated?

What is the *market size variance*?
The **Sales Price Variance** is the same as the Flexible Budget Variance. Both measure the difference between the actual results and the flexible budget amounts. Remember that the flexible budget is an adjusted budget, whereby all variable incomes and expenses have been adjusted to reflect the actual sales volume in terms of units sold. This means that the difference between the actual results and the flexible budget is caused only by a difference between the standard and the actual price, not a difference between actual and budgeted quantity.

The formula for the calculation is:

\[ (AP - SP) \times AQ \]

Where:
- \( AP \) = Actual price per unit
- \( SP \) = Standard price per unit
- \( AQ \) = Actual quantity sold

Two, three and four-way analysis are the different ways of classifying the four overhead variances.

In four-way analysis, each of the four variances are looked at independently.

In three-way analysis, the variable overhead spending variance and the fixed overhead spending (budget) variance are combined into what is called the **Spending Variance**.

In Two-way analysis, the variable overhead efficiency variance is added to the Spending Variance (as used in three-way analysis) to create what is called the **Controllable Variance**. The fixed overhead volume variance remains by itself in two-way analysis.

The **Sales Price Variance** is determined by calculating each product’s individual sales price variance and summing them, as follows:

\[ \Sigma (AP - SP) \times AQ \]

This variance can be calculated for total revenue, total costs, or contribution margin (i.e., any variable line on a variance report).

The **Sales Volume Variance** measures the impact of the difference in sales volume between actual results and the **STATIC budget**.

For a single product firm, the Sales Volume Variance can also be calculated for each variable income and expense item (and the contribution margin) on the variance report as a Quantity Variance, using our general Quantity Variance formula:

\[ (AQ - SQ) \times SP \]

Where:
- \( AQ \) = Actual quantity per unit
- \( SQ \) = Standard quantity per unit
- \( SP \) = Standard price per unit

When more than one product is sold, the total sales volume variance is the sum of the sales volume variances for each item:

\[ \Sigma (AQ - SQ) \times SP \]

This variance can be broken down into the sales quantity variance (variance due to a difference between actual total units sold of all products and budgeted total units sold of all products, assuming no variance between actual and budgeted sales mix) and sales mix variance (variance due to a different mix of products being sold than was budgeted).

\[ Sales Quantity Variance = (AQ - SQ) \times WASPSM \]

\[ Sales Mix Variance = (WASPAM - WASPSM) \times AQ \]

Where:
- \( WASPAM \) = Weighted Average Standard Price-Actual Mix
- \( WASPSM \) = Weighted Average Standard Price-Standard Mix

The **market size variance** is the difference in the budgeted contribution margin caused by the actual market size (in number of units) being different from the expected market size (in number of units). It is calculated as follows:

\[ \frac{(Actual\ Market\ Size\ in\ Units - Expected\ Market\ Size\ in\ Units) \times Expected\ Market\ Share\ %}{ \times Standard\ Weighted\ Average\ Contribution\ Margin\ per\ Unit} \]

The **Sales Volume Variance** measures the impact of the difference in sales volume between actual results and the **STATIC budget**.
What is the market share variance?

What are the different responsibility centers?

What are common costs and what are the two ways they are allocated?

What are the elements of the contribution income statement?

Define the term net revenues as used in the contribution margin income statement.

Define the term variable manufacturing costs as used in the contribution margin income statement.
**Cost Centers** are responsible only for the **incurrence of costs**. It does not have any revenue. An example of this type of center would be an equipment maintenance department or an internal accounting department.

**Revenue Centers** are responsible only for **revenues**. A sales department is a revenue center. Though every department will incur some costs, the costs incurred by a revenue center are generally immaterial and may not even be controllable by the center.

**Profit Centers** are responsible for both **revenues and expenses**. An example would be a department within a store.

**Investment Centers** are responsible not only for **profit** (revenues and costs), but also some amount of **invested capital** and providing a return on that capital.

The **market share variance** is the difference in the budgeted contribution margin caused by the actual market share being different from the expected market share. It is calculated as follows:

\[
\text{Market Share Variance} = \left( \frac{\text{Actual Market Share} - \text{Expected Market Share}}{\text{Expected Market Share}} \right) \times \text{Actual Market Size in Units} \times \text{Standard Weighted Average Contribution Margin per Unit}
\]

**Sales**
- Variable Manufacturing Costs of Units SOLD = Manufacturing Contribution Margin
- Variable Nonmanuf. Costs of Units SOLD = Contribution Margin
- Controllable Fixed Costs = Segment Manager Performance or Controllable Margin
- Noncontrollable, Traceable Allocated Fixed Costs = Segment Margin or Contribution by Segment
- Untraceable, Common Costs = Operating Income

**Common costs** are those costs that are **shared by two or more responsibility centers**, for example, costs of service departments such as IT, human resources or accounting.

1) The **stand-alone** cost allocation method allocates costs proportionately among all users on some basis that relates to each user’s proportion of the entire organization such as each responsibility center’s other costs as a proportion of the company’s total costs or the proportion of each responsibility center’s sales to sales of the entire company.

2) The **incremental** cost-allocation method ranks users of a cost object according to their total usage or on some other basis. The first-ranked user of the activity is called the **primary user**. The primary user is charged for costs up to what its cost would be if it were the only user. Then, the next-ranked user(s) are called the incremental users and are allocated the additional cost, proportionately if more than one.

**Variable manufacturing costs** include all of the variable costs of production – labor, materials and variable overheads – that were incurred in the production of the units sold.

**Net revenues** represent the sales value of all sales for the period.
Define the term **manufacturing contribution margin** as used in the contribution margin income statement.

Define the term **variable nonmanufacturing costs** as used in the contribution margin income statement.

Define the term **contribution margin** as used in the contribution margin income statement.

Define the term **controllable fixed costs** as used in the contribution margin income statement.

Define the term **controllable margin** or short-term segment manager performance as used in the contribution margin income statement.

Define the term **noncontrollable, traceable fixed costs** as used in the contribution margin income statement.
Variable nonmanufacturing costs include all variable costs that are not part of the production process. This includes, but is not limited to, marketing, selling, general and administrative costs that are variable in nature.

The manufacturing contribution margin of the company is the amount of money that is available to cover nonmanufacturing variable costs, all fixed costs and then flow to profit. After all variable manufacturing costs are covered, increases to the contribution margin flow directly to profit.

Controllable fixed costs are fixed costs that the segment manager is able to control and influence. Examples of controllable fixed costs are supervisory salaries and any expenses that are incurred by that segment only such as some sort of sales promotion.

The contribution margin of the company is the amount of money that is available to cover fixed costs and then flow to profit, after all variable costs are covered.

Noncontrollable, traceable fixed costs are fixed costs that cannot be controlled by the manager within a time span of one year or less. They are usually facilities costs such as depreciation, taxes and insurance.

The controllable margin or short-term segment manager performance is important because it is a measurement of all the revenues and expenses (variable and fixed) that are controllable by the individual managers on a short-term (less than one year) basis. The controllable margin is a good measure of a manager’s short-term performance.
Define the term *contribution by strategic business unit (SBU)* or “segment margin” as used in the *contribution margin income statement*.

What are *noncontrollable untraceable costs*?

What is the *transfer price*?

What is the *basic issue* for companies regarding *transfer pricing*?

What are the *goals* of a *transfer pricing system*?

What are common ways of *setting the transfer price*?
Noncontrollable untraceable costs (sometimes called common costs) are the costs that are incurred at the company level and would continue even if the individual business segment were discontinued. Because they would continue if any individual segment was discontinued, these costs should not be allocated to the individual departments, or segments. Rather, they are subtracted from the sum of the segment margins to calculate the company's net income.

Noncontrollable, untraceable costs (called common costs) must not be allocated to the individual segments.

The basic issue of transfer prices is simply how much should one unit of a company charge another unit of the same company for its goods or services. The goal in setting a transfer price is that the method used will motivate the department managers to do what will provide the greatest benefit to the company as a whole, rather than to act in their own interest. In order to accomplish this, there must be goal congruence among the various departments, and management of the company needs to be committed to achieving those company goals. The transfer prices used should provide an incentive for managers to make decisions that are consistent with the firm’s goals, while at the same time, fairly rewarding the managers.

The contribution by strategic business unit (SBU) or segment margin is a measure of the performance of each business unit. It may also be used as a measure of the long-term performance of the manager, if the manager can control the noncontrollable traceable fixed costs over a long-term period. However, in many cases, decisions about noncontrollable traceable fixed costs are made by others.

A transfer price is the price that is charged by one unit of the company to another unit of the same company for the services or goods produced by the first unit and “sold” to the second unit. They are used by profit and investment centers in order to calculate the costs of services received from service departments and revenues when “selling” a product to another department when that product has an outside market. Transfer pricing is most common in firms that are vertically integrated, i.e., they are engaged in several different value-creating operations for a product. When transfers of goods or services are made from one profit center to another profit center within the same company, a portion of the revenue of one of the divisions is a portion of the cost of the other division. Therefore, the price at which the transfer takes place affects the earnings reported by each division. If the transfer price used is not the market price, this can distort reported profits and cause them to be a poor guide for cost center performance evaluation.

The most common ways of setting the transfer price are:

1) Market price
2) Cost of production plus opportunity cost
3) Full cost
4) Variable cost
5) Cost plus
6) Negotiation
7) Arbitrary
8) Dual rate

Market price is generally the best if it is available. Any cost based transfer price is dangerous because the producing department has little incentive to control prices because they know that the costs will be absorbed by the purchasing department.

A transfer pricing system must accomplish the following:

1) It must give senior management the information it needs to evaluate the performance of the profit centers.
2) It must motivate the profit center managers to pursue their own profit goals while also working toward the success of the company as a whole.
3) It must encourage the cost center managers’ efficiency while maintaining their autonomy as managers of profit centers.
4) It must be equitable, permitting each unit of a company to earn a fair profit for the functions it performs.
5) It must meet legal and external reporting requirements.
6) And it should be easy to apply.
What is return on investment and how is it measured?

What is residual income and how is it measured?

What is the balanced scorecard?

What are the four broad categories of performance perspectives that are used within the balanced scorecard method of company performance evaluation?

What are fixed, variable and mixed costs?

What are direct labor, direct material and manufacturing overhead costs?
Residual Income (RI) attempts to overcome the weakness in ROI by measuring the amount of return that is provided by a department. RI is calculated as income (net income before taxes) minus a targeted amount of return on the investments that are employed by that division. The targeted return is calculated as follows:

\[ \text{Target Rate of Return} \times \left( \frac{\text{Assets}}{\text{Investments}} \right) \]

Two items that are needed in the calculation of RI are:
1) The targeted amount of return is usually some percentage of the total assets of the division or the invested capital in the division, and
2) The percentage used in the calculation is the target rate that has been set by management.

The four perspectives are:
1) **Financial perspective**, focusing on profitability. Some of the more common measures of financial performance are: operating income, revenue growth, revenue from new products, gross margin percentage, cost reductions, EVA and ROI.
2) **Customer perspective**. Developing the company’s customer perspective involves identifying the market segment(s) it wants to target and then measuring its success in those segments. Examples include customer satisfaction, market share, and levels of customer service.
3) **Internal business process perspective**, which includes innovation in products and services, innovations and improvements in operations, and customer service/support after the sale.
4) **Innovation and learning**, which emphasizes an organizational culture that supports employee innovation, growth and development.

The trend today is to use a more encompassing method of evaluation and include not only financial measures, but also nonfinancial measures by looking at the overall contribution to the achievement of company goals. This is called a balanced scorecard.

The typical categories measured in a balanced scorecard are:
1) **Financial performance**,  
2) **Customer satisfaction**,  
3) **Internal business processes**, and  
4) **Innovation and learning**;  
   a) Employee capabilities,  
   b) Information system capabilities, and  
   c) Motivation and empowerment of employees.

Direct labor is labor that may be directly traced to the production of a unit. For example, assembly line workers are direct labor costs for a manufacturing company. Direct labor is a production cost.

Direct material is the cost of the materials that are put directly into the finished product. Direct material is a production cost.

Manufacturing (or production) overhead costs are the costs of the company that are not direct material or direct labor, but are necessary costs of production. Examples are indirect labor, indirect materials, rework costs, electricity and other utilities, and factory rent.

All product costs are inventoriable costs (put into inventory) as opposed to period costs (like selling) that are expensed in the period incurred.

Fixed costs are costs that do not change within the relevant range of production, such as factory rent. The total amount of these costs does not change with production. However, the fixed cost per unit decreases as production increases.

Variable costs are costs that are incurred only when a product is made or sold, such as material or commission. The total variable cost increases as production increases, but per unit variable cost will remain unchanged as production increases.

Mixed costs are costs that have both a fixed and a variable component. An example is a phone. You pay a certain fixed amount each month and then a variable amount for each long distance call that you make.
What are the sources of manufacturing overhead costs?

What are prime costs and conversion costs?

What are opportunity costs?

What are carrying costs?

What are sunk costs and what are committed costs?

What are discretionary costs?
The prime costs are direct material and direct labor. In other words, prime costs are the costs of the direct inputs.

The conversion costs are overhead (both fixed and variable) and direct labor costs. These are the costs that are required to convert the direct material into the final product.

The sum of prime costs and conversion costs does not equal the total production costs as both classifications include direct labor.

In process costing production costs are divided into two categories: material and conversion costs.

Carrying costs are the costs that the company incurs when it carries inventory. Carrying costs include rent and utilities related to the storage facility, insurance and taxes on the inventory, costs of employees who manage and protect the inventory, the lost opportunity cost of having money invested in inventory and other inventory storage costs.

Because the storage of inventory does not add value to the items themselves, storage costs are expensed on the income statement as they are incurred, and they are not included in the cost of the inventory (in other words they are a period cost, not a product cost).

Discretionary costs are costs that may or may not be spent, at the decision of a manager. In the short term, these costs will not cause an adverse effect on the business if they are not incurred, but in the long run they will need to be spent. These are cost decisions that are made periodically and are not closely related to input or output decisions.

Advertising is usually an example of a discretionary cost because the company will probably not lose a great deal if it does not advertise in the short term. However, an extended period of advertising would most likely cause losses for the company.

Sunk costs are costs that have already been incurred and may not be recovered. These costs are irrelevant in the decision making process because of the fact that they have already been incurred and no current or future decision can change that.

A committed cost is similar to a sunk cost in that it has not been incurred, but the company has committed to incurring it in the future. Committed costs are also irrelevant in the decision making process.

There are three main categories of costs that are treated as manufacturing overhead:

Indirect labor costs represent labor that is part of the overall production process, but that does not come into direct contact with the product itself. The maintenance department is a common example of indirect labor.

Indirect material costs represent usage of materials that are not the main components of the finished goods. Examples would be glue, screws and nails.

General production overheads are the rest of the production overheads that do not classify as indirect labor or materials, such as factory rent, electricity and other utilities and general expenses.

Overhead costs may be fixed or variable, depending upon their behavior.

An opportunity cost is "the contribution to income that is forgone by not using a limited resource for its best alternative use." In other words, it is what we give up by using a resource in a particular use. It is the lost benefit that we would have gained from the next best use of that resource.

When calculating the opportunity cost, it is critical to keep in mind that the opportunity cost is calculated only from the contribution that would not be received in the other alternatives available to us.
What are marginal costs?

What are engineered costs?

What are imputed costs?

How do you calculate cost of goods sold (COGS)?

How do you calculate cost of goods manufactured (COGM)?

What is variable costing?
Engineered costs are costs that have a definite physical relationship to the activity base or measure. They result from activities that have well defined cause and effect relationships between inputs and outputs and between costs and benefits. Direct materials and direct labor are engineered costs, as are indirect resources that vary with product specifications and production volume. The value added by activities associated with engineered costs is fairly clear and easy to measure. Engineered costs are variable costs in their cost behavior.

Marginal costs are the costs necessary to produce one more unit.

The term marginal has to do with the next unit. Marginal revenues are the revenues received from producing one more unit. Marginal profit is the profit that is received from the sale of one more unit.

**COGS** represents the cost to produce or purchase the units that were sold during the period. It is perhaps the largest individual expense item on the income statement. COGS is calculated using the following formula:

\[
\text{Beginning finished goods inventory} + \text{Purchases} - \text{Ending finished goods inventory} = \text{Cost of Goods Sold}
\]

An imputed cost is a cost that does not exist but is needed for use in a decision-making process. Interest or a cost of capital is often an imputed cost. For example, in a loan that does not have a stated interest rate, an interest rate will often be imputed to determine the cost of the loan. This imputed rate is assumed, and is based on the market rate or rates for similar loans. It does not exist, but is necessary for use in decision-making.

Under variable costing (also called direct costing), fixed factory overheads are a period cost and expensed in the period they are incurred.

Total manufacturing costs include only variable manufacturing costs. Other non-manufacturing variable costs are NOT included in manufacturing costs (not *inventoriable*). Manufacturing costs become cost of goods sold only when sold.

Under variable costing profit is a function of the sales level only. Variable costing is **NOT allowed under GAAP** for external reporting, but is considered to be very useful for internal decision-making.

Key items in the variable costing report are: Manufacturing Contribution Margin (sales minus all variable manufacturing costs) and Contribution Margin (sales minus all variable costs). All fixed costs are then subtracted from the contribution margin to calculate Net Income.

The **COGM** represents the cost of the units completed and transferred out of work-in-process during the period. For a manufacturing company this amount will be part of the cost of goods sold calculation. COGM does not include the cost of work that was done on units that were not finished during the period. COGM is calculated using the following formula:

\[
\text{Direct Materials Used}^* + \text{Direct Labor Used} + \text{Manufacturing Overhead Applied} - \text{Beginning Work-in-process Inventory} - \text{Ending Work-in-process Inventory} = \text{Cost of Goods Manufactured}
\]

* Direct Materials Used = Beginning Direct Materials Inventory + Purchases + Transportation-In – Net Returns – Ending Direct Materials Inventory
What is absorption costing?

How does inventory level affect income under variable and absorption costing?

What is the format for the income statement using absorption costing?

What is the format for the income statement using variable costing?

Why is variable costing considered to be a superior method of cost allocation for internal purposes compared to absorption costing?

How is the difference in income between variable and absorption costing calculated?
When inventory levels change during the period (meaning sales do not equal production), variable and absorption costing will give different levels of net income. This is because of the different treatment of fixed manufacturing overheads.

If **inventory increases** during the period, income will be higher under absorption costing, because some of the fixed manufacturing overhead costs of the current period have been put into the balance sheet as part of inventory. If **inventory decreases** during the period, income will be higher under variable costing. This is because absorption costing income will include all of this period’s fixed manufacturing overheads as well as some of the prior period’s fixed manufacturing overheads that were in beginning inventory.

Under **absorption costing**, fixed factory overhead costs are allocated to the units produced during the period according to some predetermined ratio and are therefore a **product cost** (included in the cost of the item produced).

Total manufacturing costs include ALL manufacturing costs (material, labor and overhead) – variable and fixed.

Under the absorption method, the profit of a company is influenced by the difference between the level of production and the level of sales (or the change in inventory during the period).

Absorption costing is **allowed under GAAP** for external reporting.

Key items in the variable costing report are: **Gross Margin** (sales minus costs of goods sold). All non-production costs (selling and administrative) are then subtracted from gross margin to calculate **Operating Income**.

Under **variable costing** we will calculate a **manufacturing contribution margin** by subtracting all **variable manufacturing costs** from revenue. From this manufacturing contribution margin, we subtract nonmanufacturing variable costs to get the **contribution margin**. All fixed costs (manufacturing and non-manufacturing) are then subtracted from contribution margin to calculate net income.

The pro forma income statement under variable costing looks as follows:

Sales revenue

= (Variable manufacturing costs)

= Manufacturing contribution margin

= (Variable nonmanufacturing costs)

= Contribution Margin

= (Fixed manufacturing costs)

= Operating Income

Under absorption costing we will calculate a **gross margin** by subtracting all **variable and fixed manufacturing costs** (this being COGS) from revenue. All variable and fixed nonproduction costs are then subtracted from the gross margin to calculate net income.

The pro forma income statement under absorption costing looks as follows:

Sales revenue

= (Cost of goods sold) – made up of

= variable and fixed manufacturing costs

= Gross margin

= (Variable nonmanufacturing costs)

= (Fixed nonmanufacturing costs)

= Operating Income

**Absorption costing is required for external reporting.** However it is generally thought that **variable costing is better for internal uses** for the following reasons:

1) Fixed costs are not included in the calculation of cost to produce. Therefore companies are able to make better and more informed decisions about profitability and product mix.

2) Operating income is directly related to sales levels. It is not influenced by changes in inventory levels due to production or sales variances.

3) The use of variance analysis required with absorption costing may be tedious and confusing because of the different way the costs are reported.

4) The impact of fixed costs on profit is obvious and visible because they are costs on the income statement.

5) It is easier to determine the “contribution” to fixed costs made by a division or product – and thereby helps determine if the product or division should be discontinued.

In questions on the exam, the difference in income between the variable and absorption costing may be determined as follows:

Fixed manufacturing overhead per unit produced * Change in inventory

If inventory has increased during the period, you must use the fixed manufacturing overhead per unit produced in the current period.

If inventory has decreased during the period, you must use the fixed manufacturing overhead per unit produced from the previous year. This is because it is the units from the previous year that are the difference between production and sales in the current period.
What are joint products?

How are joint costs allocated to the joint products?

What are by-products and how are the costs of by-products treated?

What is process costing?

What are the steps in process costing?

What is the physical flow of goods in process costing?
The most common methods of allocating joint costs between joint products are:

1. **Physical-measure method** – based on some physical measure like number of units, weight, volume of each of the final products produced.
2. **Relative sales value** – based on the sales values of each product at the splitoff point relative to the total sales value of all the joint products.
3. **Estimated Net Realizable Value (NRV)** – based on the NRV of the two products. NRV is the difference between the sales price and separable costs incurred after splitoff. If one (or more) of the products can and will be sold at the splitoff point, that product’s NRV is its sales value at the splitoff point.
4. **Constant gross margin percentage NRV** – allocates joint costs so that all of the products have the same gross margin percentage.

**Joint products** occur when one production process leads to the production of two or more finished products. These products are not exactly identical, but they share the same production process up to what is called the **split-off point**. This is the point at which the two products stop sharing the same process and become different, identifiable products.

The main issue with joint products is how to allocate for the **joint costs** (those costs incurred prior to the split-off point) to the different products. Joint costs may include direct materials, direct labor and overhead. Costs incurred after the split-off point by each of the product are separable costs and are allocated to each product as they are incurred by that product.

**Process costing** is the process by which costs are assigned to individual products when the products are all relatively similar (homogeneous) and are mass-produced. This is basically applicable to **assembly lines** and their process of production.

In process costing all of the costs that are incurred by a process (or department) are collected and then allocated to the individual goods that were produced, or worked on, during that period. Thus, this method averages total production costs of all units and gives the same cost to all units produced during the period. The number of units of production for the purpose of cost allocation are stated in **Equivalent Units Produced (EUP)**. This calculation of EU is made separately for each input.

The normal resources in questions are materials and conversion costs.

**By-products** are the low-value products that occur naturally in the process of producing higher value products. They are, in a sense, accidental results of the production process. The main issue for accounting for these by-products relates to the treatment of the costs and revenues associated with these by-products.

**Generally, production costs are not allocated to the by-products** and they are treated as a no-cost item. As the by-products are sold, the money received is accounted for as a reduction of the cost of production of the main product rather than as revenue. This treatment is justifiable because of the immaterial amounts that are involved.

Alternatively, costs may be assigned to the by-products, and then when they are sold, revenue will be recognized as well as cost of goods sold. This is a more complicated process and is usually not used because by-products are low value items by nature.

**Physical Flow of Goods** tracks the physical units of product that have been through the particular production process. This does not consider whether the unit was completed or not during the period, just that it was in the production process. The key formula is:

\[
\text{Units in Beginning WIP} + \text{Units Transferred In/Started this period} = \text{Units in Ending WIP} + \text{Units Transferred Out/Finished Goods}
\]

**Transferred in** units are the units that are transferred from the previous process/department to the process/department in question.

**Transferred out** units are the units that are transferred to the next process/department from the process/department in question.

The steps in process costing are:

1. Determine the physical flow of goods.
2. Calculate how many units were started and completed during the period.
3. Determine when materials are added to the process.
4. Calculate the equivalent units of production for materials and conversion costs.
5. Calculate the costs incurred during the period for materials and conversion costs.
6. Calculate the cost per equivalent unit for materials and conversion costs.
7. Allocate the costs for materials and conversion costs separately between EWIP and Transferred Out according to the equivalent units in each.
What are equivalent units produced and how are they calculated?

How are EUP calculated under FIFO process costing?

How are EUP calculated under weighted average process costing?

How do you calculate the costs incurred during the period under process costing for materials and conversion costs using FIFO?

How do you calculate the costs incurred during the period under process costing for materials and conversion costs using the weighted average inventory method?
In process costing, there are two different ways to track inventory. The difference between the methods is the way in which BWIP is treated.

First-in-first-out (FIFO) assumes that what is in BWIP is finished before any new units are started. Thus, under FIFO, all of the costs that are in BWIP are transferred directly to finished goods. The only costs allocated to the work performed this period are the costs that were actually incurred during the period.

Weighted Average (WAVG) assumes that all of the units will be treated the same regardless of when they were started or produced. In this method all of the costs that are in BWIP are added together with the costs that were incurred during this period. Also, all of the work already performed on BWIP is assumed to have been done this period as well. Because of the mixing of the costs of the previous period with the costs of the current period, the resultant cost is the weighted average cost.

Equivalent units produced (EUP) are computed for each type of input separately as follows:

\[
EU = \text{Physical units worked on} \times \% \text{ of work done}
\]

**Example:** If there are 200 units in ending WIP and each unit is 30% complete as for conversion costs, then the EU of work done during the period for conversion costs for ending WIP is 200 units x 30% = 60 EU.

In FIFO, the costs that are in Beginning WIP are automatically transferred to FG and are not included in computation of either total costs or EUP of the period in question. Thus, per EU cost is computed for this period only. The cost to EWIP is based on this per EU cost times the number of EUP in EWIP.

The calculation of **EU Produced** (EUP) during the period is done as follows under the weighted average method:

\[
\text{Units Completed} + \text{Starting of EWIP} = \text{EUP for period}
\]

In this assumption the costs that are in Beginning WIP are included in the total costs to account for this period. Also, the EU in Beginning WIP are included in total EUP for the period in question. Thus, per EU cost is the average cost. Cost to Ending WIP is based on this per EU cost times the number of EUP in EWIP.

The **cost per EU** is calculated as follows:

\[
\frac{(\text{Cost in BWIP} + \text{Costs added this period})}{\text{EU this period} + \text{EU in BWIP}}
\]

The calculation of the current period costs in process costing is affected by the inventory method that is used in much the same way as the calculation of EUP is affected. FIFO and WAVG allocate the costs differently. The difference relates only to the costs that are in the BWIP. All other costs are handled in the same way in both methods. Under the weighted average method we will take all of the costs that are in BWIP and simply add them together with the costs that were actually incurred during this period. This is the same as we did with the calculation of EUP under the weighted average method. This “total cost” will be allocated to the EUP that was calculated under the WAVG method.

Because of mixing the costs of the current and previous periods, we get the weighted average.
How do you calculate the cost per EUP for materials and conversion costs in process costing using FIFO and the weighted average inventory method?

In process costing, how do you allocate the costs for materials and conversion costs separately between EWIP and Transferred Out according to the equivalent units in each?

What is spoilage and what are the different types of spoilage?

List and define the category of costs included in factory overhead.

How is overhead allocated under the traditional method?

List and explain the 4 possible activity levels to use as a basis to allocate manufacturing overhead.
After the rates per EUP for materials and conversion costs have been determined, the task to allocate the costs to finished goods and to EWIP based upon the number of EUP that are in EWIP and FG is simply a mathematical exercise. This task requires multiplying the EUP by the rate (or cost) per EUP.

Once the EUP has been determined (under either FIFO or W AVG), and the costs to be allocated have been identified, you must determine a rate (or unit cost) per EUP for both raw materials and conversion costs. This is done by dividing each of the total costs to be allocated by the EUP for both materials and conversion costs. These rates for materials and conversion costs must be calculated separately because the EUP for both may be different.

Remember that if using FIFO basis, all of the costs associated with the BWIP are automatically transferred to FG and they do not need to be allocated to the EUP.

The categories of costs included in factory overhead (OH) are:

1) **Indirect materials** – materials not identifiable with a specific product or job, such as cleaning supplies, small or disposable tools, machine lubricant and other supplies;
2) **Indirect labor** – salaries and wages not directly attributable to a specific product or job, such as plant superintendent, janitorial services and quality control
3) **General manufacturing overheads**, such as facilities costs (factory rent, electricity and utilities) and equipment costs.

Normal spoilage occurs due to the technical characteristics of a process, and cannot be eliminated. The cost of normal spoilage is added to the costs of good units transferred to the next processes or to finished goods. Thus, it becomes part of the costs of goods manufactured.

Abnormal spoilage is any spoilage in excess of normal spoilage. The costs of the abnormal spoilage are expensed on the income statement in that period as a loss from abnormal spoilage.

The costs of reworking spoiled goods so that they may be sold is charged to the factory overhead account and allocated to all good units as part of overhead.

Waste is the useless material left over after production is complete.

Shrinkage is when a product simply evaporates or loses some of its quantity through time. Accounting for shrinkage is done as for spoilage.

Under the traditional method, overhead costs are allocated to the products based on one allocation basis (AB), like direct labor hours or machine hours. The basis of allocation should closely reflect the reality of the way in which the costs are actually incurred in the department. The amount of overhead that is allocated in a period (under normal costing) is equal to:

\[
\text{Predetermined overhead allocation rate} = \frac{\text{Budgeted Dollar Amount of Overhead}}{\text{Budgeted Activity Level}}
\]

Where the predetermined overhead allocation rate is calculated at the beginning of the year as follows:

\[
\text{Predetermined overhead allocation rate} = \frac{\text{Budgeted Dollar Amount of Overhead}}{\text{Budgeted Activity Level}}
\]

(planned number of AB for the period)
What are the standard, normal, and actual costing systems?

What is overapplied and underapplied overhead and how is it accounted for?

What is activity based costing?

List and explain the 4 types of activities to be considered within an activity based accounting (ABC) system.

What are advantages and disadvantages of activity based costing (ABC) systems?

List and explain the 3 drivers that exist within an activity based costing system as a basis for cost allocation.
If the amount of overhead applied is greater than the actual overhead incurred, overhead is said to be overapplied. Overhead is underapplied if the applied overhead is less than the actual overhead incurred.

The amount of over or underapplied overhead is calculated as follows:

Actual overhead incurred – Overhead applied

In the ledger, overapplied overhead is reflected as a credit balance on the overhead control account and underapplied is shown as a debit balance in the same account. If the balance on the overhead control account is immaterial, it is simply charged to the Cost of Goods Sold (COGS) at the end of the period.

If the amount is material then it must be distributed between WIP, Finished Goods and COGS proportionately.

There are four categories of activities to be considered in an ABC system:

1) **Unit-level activities** – These activities are performed for each unit that is produced. Some examples are hours of work, inspecting each item, operating a machine and performing a specific assembly task.

2) **Batch-level activities** – These activities occur each time a batch is produced. Some examples are machine setup, purchasing, scheduling, materials handling and batch inspection.

3) **Product-sustaining activities** – These activities are incurred in order to support the production of a different product from what is currently produced. Examples include product design and engineering changes.

4) **Facility-sustaining activities** – These activities are incurred to support production in general, such as security, maintenance, plant management, depreciation of the factory and property taxes.

The **ABC** method allocates overhead costs based on **cost drivers**. According to the Statement of Management Accounting, activity based costing:

“identifies the causal relationship between the incurrence of cost and activities, determines the underlying driver of activities, establishes cost pools related to individual drivers, develops costing rates and applies cost to product on the basis of resources consumed (drivers).”

While analyzing the production process to find the cost drivers, the company will also identify any **non-value adding procedures** (for example, storage). These will be reduced or eliminated since they do not add value to the finished good. A **value-added activity** is one that increases the value of the product.

Some of the **advantages** of ABC are:

1) ABC provides a more accurate product cost for use in pricing and strategic decisions.

2) By identifying the activities that cause costs to be incurred, ABC enables management to identify activities that do not add value to the final product.

Some of the **disadvantages** of ABC, are:

1) Not everything can be allocated strictly on a cost driver basis. This is particularly true in respect to facility-sustaining costs.

2) It is expensive and time consuming to implement and maintain.
What is job-order costing?

What is life cycle costing?

List and explain the three categories of costs within a life cycle costing system.

What is service cost allocation and what are the different methods?

What is the direct method of service cost allocation?

What is the step method of service cost allocation?
In **life-cycle costing** a company is not determining the cost of production in the narrow sense of the physical production of one unit. Rather, the company is taking a much longer view to the cost of production and is attempting to allocate all of the research and development, marketing, development, after sale service costs and any other **cost that is associated with this product during its life cycle**.

**Whole-life costs** are equal to life-cycle costs plus after purchase installation, training, operating, maintaining and disposal costs relating to usage of the product that are incurred by the customer.

**Job-order costing** is the method in which all of the costs that are associated with a specific job (or client) are accumulated and charged to that job (or client).

This method may be used when all of the products or production runs are **identifiable and unique** from each other. An example of this would be an audit firm or a legal firm – as an employee works on a particular client or case, they charge their time and any other costs to that specific job.

At the end of the project, the company needs to add up all of the costs assigned to it to determine the cost of performing that job.

Overhead still must be applied using some sort of basis, but labor and material is charged to the job at the actual costs.

Common examples of service departments are maintenance, finance, training, a cafeteria, general administration, etc. These **service, or support, departments** incur costs and these costs must be transferred to the products that are produced in order to calculate the full cost of production. There are three different methods for allocating the costs of service departments to production departments:

1) Direct method,
2) Step-down (or step) method, and
3) Reciprocal method.

The key difference between the three is treatment of services between the support departments.

All of the costs in the life cycle of the company can be broken down into three categories. These three categories and the types of costs that are included in them are:

**Upstream Costs** (before production):
1) Research and Development
2) Design – prototyping (the first model), testing, engineering, quality development

**Manufacturing Costs:**
1) Purchasing
2) Direct and indirect manufacturing costs (labor, materials and overhead)

**Downstream Costs** (after production):
1) Marketing and distribution
2) Services and warranties

In the **step method**, partial recognition of the services that service departments provide to each other takes place, but there is only one-way allocation of the costs between the service departments. After a service department has had its costs allocated to the production departments and remaining service departments, it will not receive any costs from the other service departments. This leads to a stair-step-like diagram of cost allocations.

To do this, we must have an order for allocating the costs of the service departments. This is usually done based upon the % of their services that are used by other service departments or other methods based on usage or size. The department that provides the highest percentage of services to other service departments is allocated first.

In the **direct method**, services provided by one service department to another service department are ignored. All of the costs incurred by the service departments are allocated directly to the production departments. This allocation is done based on the pro rata usage of each service department by the production departments.

When calculating the usage ratios for the different production departments, **only the usage of service departments by the production departments is taken into account**. The usage by other service departments is NOT included in determining either the denominator or numerator in the process of allocation. This is because the costs from service departments are not allocated between each other.

This is the easiest but the most inaccurate among the three methods.
What is the reciprocal method of service cost allocation?

List the two methods to estimate fixed costs for situations where costs are mixed or the fixed costs are not segregated from the variable costs in the historical information available.

Explain the High-Low points method to estimate fixed costs in a situation where costs are mixed costs or the fixed costs are not segregated from the variable costs in the historical information available.

Explain how regression analysis can be used to estimate fixed costs in a situation where costs are mixed costs or the fixed costs are not segregated from the variable costs in the historical information available.

What is the difference between a push and a pull inventory system?

What is a Just-In-Time (JIT) inventory system?
There are two methods that can be used to separate fixed costs from variable costs:

1) High-Low Points Method
2) Regression Analysis

The reciprocal method is the most complicated and also most accurate of these methods because it recognizes all of the services that are provided by the service departments to the other service departments. To solve a problem using the reciprocal method, multiple equations must be used.

The multiple equations are set up as follows:

\[
\text{Total costs of a service department to allocate to production} = \text{The service department’s direct costs} + \text{The % of all other service departments’ costs attributable to that service department.}
\]

There must be as many equations as there are support departments, but on the exam there will probably be only two service departments.

Simple regression analysis can be used to find the fixed cost and the variable cost per unit when you have an independent variable such as production in units and a dependent variable such as total production costs. What is important is the relationship of the dependent variable (production costs) to the independent variable (production volume) for each month. This relationship should be consistent. If it is consistent, it can be used to predict what fixed costs and variable costs will be in any future month based on what we predict production volume will be in that month.

We use the highest and lowest observed values of the cost driver within the relevant range. By comparing the differences in production with the differences in total costs between these two months, we can determine approximately what amount of the costs are variable and what amount are fixed. Steps are:

1) Take the month of the highest level of production or usage and the month of the lowest level of production or usage
2) Calculate the Variable Cost Per Unit by dividing the difference between the highest and lowest costs by the difference between the highest and lowest production volumes:
\[
\frac{\text{Difference in Costs}}{\text{Difference in Units}} = \text{Variable Cost per Unit}
\]
3) Multiply the Variable Cost per Unit by the unit volume at either the highest or the lowest production volume to get the total variable cost at that level.
4) Subtract the total variable cost from the total cost at that level to get the fixed cost.

A Just-In-Time inventory system is a pull system, where nothing is produced until it is needed. Raw materials are purchased only for the immediate need and are not stored. Rather, they are delivered and go immediately into the production process. The philosophy is to reduce inventory costs by having the right material at the right place at the right time.

Just-In-Time inventory control requires a flexible factory in order to avoid backups at work areas and lack of work in other areas.

In a pull system, nothing is produced until it is needed, either ultimately by the customer or by the next production process.

In a push system, each department produces all it can and sends it to the next step for further processing, and production schedules are based on estimates of customer demand rather than actual customer demand. This can result in large unusable stocks of work in process and finished goods inventories.
What is **Kanban**?

List and explain the **4 major principles** of Kanban.

What is **materials requirements planning**?

What are **dependent demand inventories**?

Define the **theory of constraints (TOC)** inventory management system.

What is a **constraint** in Theory of Constraints terminology?
The major kanban principles are:

1) **Kanban works from upstream to downstream in the production process** (i.e., starting with the customer order). At each step, only as many parts are withdrawn as the kanban instructs, helping ensure that only what is ordered is made.

2) **The upstream processes produce only what has been withdrawn.** This includes producing items only in the sequence in which the kanban are received, and producing only the number indicated on the kanban.

3) **Only products that are 100 percent defect-free continue on through the production line.** In this way, each step recognizes and corrects the defects that are found before any more can be produced.

4) **The number of kanban should be decreased over time.** By constantly reducing the total number of kanban, continuous improvement is facilitated by concurrently reducing the overall level of stock in production.

Dependent demand is demand for items that are components, or subassemblies, used in the production of a finished good. The demand for them is dependent upon the demand for the finished good.

**Theory of Constraints** says that there are only a few areas in which changes in one unit’s performance will bring about a meaningful change in overall profitability. Those areas are called constraints.

Changes in a constraint can impact overall profitability because the constraint represents a process that has a greater load than other processes or has less capacity. Because that resource is constrained, it sets the pace of the entire production line. Production cannot go faster than the speed that this one resource can go.

Therefore, a change that relieves the constraint on that process and speeds up that process will also speed up the entire production line. For that reason, a change in that the unit will bring about a meaningful change in overall profitability.

**Kanban** is a Japanese term for “visual record.” It is a simple parts movement system or an inventory system in which “cards” or “tickets” are used to keep track of inventory and its movement.

Originally developed at Toyota in the 1960s, Kanban is part of a JIT system and its purpose is to manage the flow on a manufacturing assembly line. At the core of the Kanban concept is that the supplier delivers components to the production line on an "as needed" basis, signaled by receipt of a card and empty container, eliminating storage in the production area. This is a chain process where orders flow from one process to another, so production of components is pulled to the production line, rather than the pushed.

**Materials requirements planning (MRP)** is a system for ordering and scheduling of dependent demand inventories. It uses software to help manage a manufacturing process. It is a system for ordering and scheduling of dependent demand inventories.

MRP is a “push” inventory management system. Finished goods are manufactured for inventory on the basis of demand forecasts. MRP makes it possible to have the needed materials available when they are needed and where they are needed.

**Theory of Constraints (TOC)** is a means of making decisions at the operational level that will help a company to speed up its manufacturing time. Its core message is that managers’ time and effort and the associated cost should be focused on speeding up the individual specific activities that cause production to slow down. Otherwise management could be devoting it’s time to improving efficiency and speed in all areas of the manufacturing process equally. If managers spend their time and effort speeding up activities that are not slowing the production process, they are wasting resources. Unnecessary efficiency just results in the buildup of work at the slow process and before it, while activities following the slow process do not have enough work to do because work is held up in the slow process. Total manufacturing speed is not improved despite the extra cost incurred to improve efficiency.
What is *Theory of Constraints* used for?

What is *throughput time* in Theory of Constraints?

What is *throughput contribution* in the Theory of Constraints?

What are the steps in managing constraint operations through the use of TOC analysis?

What is the name of the technique used to apply Theory of Constraints to production planning?

What does *Drum-Buffer-Rope* mean in Theory of Constraints production planning?
Throughput time, or cycle time, is the time that elapses between the receipt of a customer order and the shipment of the order.

Throughput is a rate. It is the rate at which units can be produced and shipped. For example, if it takes 2 days to produce and ship 100 units, then the per day rate is 50 units per day.

Theory of Constraints (TOC) is a means of making decisions at the operational level that will impact a company's profitability positively.

The 5 steps to manage constraint operations through the use of TOC analysis are:

1) Identify the constraint.
2) Determine the most profitable product mix given the constraint.
3) Maximize the flow through the constraint.
4) Add capacity to the constraint.
5) Redesign the manufacturing process for flexibility and fast cycle time.

Throughput contribution is the rate at which contribution dollars are being earned. Throughput contribution is the revenue earned from the sale of units minus the totally variable costs only (such as direct materials) for those units produced during a given period of time.

The drum is the bottleneck or the constraint, because it provides the “beat” that the entire operation must march to.

The buffer is a minimum level of work-in-process inventory provided at the drum as protection against delays upstream that would delay the drum. There should be only one area of queuing (i.e., work-in-process inventory buildup) in the facility, and that should be in front of the bottleneck.

The rope is the schedule for releasing materials to the floor to begin processing, so that they will reach the drum at just the right time. The rope limits the amount of inventory in the system. Material is released only at the rate that the drum can consume, and the rope keeps it from being released too soon.

The application of TOC to production is called Drum-Buffer-Rope (DBR).
What are inventory costs within the theory of constraints (TOC) inventory management system?

Compare ABC inventory management to TOC inventory management.

What is value chain analysis?

What are the 3 steps in a value chain analysis?

What is business process reengineering?

What is benchmarking?
ABC and TOC are complementary analytical tools that are used to assess the profitability of products. TOC takes a short-term approach to profitability analysis while ABC develops long-term analysis (price and profit planning). ABC includes all product costs, while TOC focuses only on materials costs. However, because ABC does not include the information on constraints and production capacity, TOC can be used to determine the best short-term product mix.

In TOC terms inventory costs are limited to costs that are strictly variable, called “super-variable,” and these are usually only direct materials. 

Note: this does not mean that absorption costing for external financial reporting purposes is done differently when TOC is being used. It means only that inventory costs for internal TOC analysis purposes are different from inventory costs for financial reporting purposes.

There are three steps in value chain analysis:
1) Identify the activities that add value to the finished product.
2) Identify the cost driver or cost drivers for each activity.
3) Develop a competitive advantage by adding value to the customer or reducing the costs of the activity.

The value chain includes all of the activities that go into the production of the product that add value to the finished good. By analyzing this, the company can determine what they can do to add more value to the product, and also what does not add value and can be eliminated. The steps in the value-chain are:
1) Research and Development,
2) Design of products, services or processes,
3) Production,
4) Marketing,
5) Distribution, and
6) Customer service.

Benchmarking is the company’s process of using the standards set by other companies as a target or model for its own operations. (This is also called best practices.) It is the process of continuously trying to emulate (imitate) the best companies in the world. By striving to meet the standards of the best companies, an organization may be able to create a competitive advantage through achievement of a higher standard than its competitors.

The company used as the benchmark does not necessarily need to be in the same industry as the company that is trying to improve. The first thing that a company must do is identify the critical success factors for its business and the processes it needs to benchmark. After this, a team is set up to investigate and document what the best practices are. The team will need to identify what areas to improve and how to do this by utilizing the experience of the benchmarked company.

Business process reengineering means restructuring of a process or procedures that is brought about by rapidly changing technology and today’s competitive economy. In applying the concept of process reengineering, management starts with a clean sheet of paper and redesigns processes to accomplish its objectives. Operations that have become obsolete are discarded.

For instance, instead of simply using computers to automate an outdated process, technological advances bring opportunities to fundamentally change the process itself.
Define the 2 types of activity based management (ABM) systems.

Explain the concept of Kaizen.

What are the conformance costs of quality?

What are the nonconformance costs of quality?

What are the opportunity costs of quality?

What is Total Quality Management (TQM)?
The term **kaizen** is a Japanese word that means "improvement." As used in business, it implies "continuous improvement," or slow but constant incremental improvements being made in all areas of business operations. Small-scale improvements are considered to be less risky than a major overhaul of a system or process. The slow accumulation of small developments in quality and efficiency can, over time, lead to very high quality and very low costs.

Activity-based management is divided into **operational ABM** and **strategic ABM**.

1) **Operational ABM** uses ABC data to **improve efficiency**. The goal is for activities that add value to the product to be identified and improved, while activities that do not add value are reduced in order to cut costs without reducing the value of the product or service.

2) **Strategic ABM** uses ABC data to **make strategic decisions** about what products or services to offer and what activities to use to provide those products and services. Because ABC costs can also be traced to individual customers, strategic ABM can also be used to do customer profitability analysis in order to identify which customers are the most profitable so the company can focus more on them and on serving their needs.

**Nonconformance costs** are the costs that are incurred after a defective product has already been produced. The costs of nonconformance can be broken down into two types:

1) **Internal failure** occurs when we detect the problem before shipment and the costs associated with this are: **rework, scrap, tooling and downtime**, and
2) **External failure** happens when we do not detect the defect until the product is already with the consumer. The costs of this are: **warranty costs, product liability costs and the loss of customer goodwill**. Environmental costs are also external failure costs.

**The Costs of Conformance** are the costs that are incurred to prevent and assess quality internally to insure that no defective products are produced. There are two types of conformance costs:

1) **Prevention Costs** are the costs that are incurred in order to prevent a defect from occurring in the first place, and
2) **Appraisal Costs** are the costs that are incurred in order to determine if an individual unit is defective. These are the costs of testing, inspection and internal quality programs.

**Total Quality Management (TQM)** is a methodology or process that has had a tremendous influence on the nature of business in the past couple of decades. The basic premise of TQM is that quality improvement is a way of increasing revenues and decreasing costs. As such, a company should continuously strive for improvement in performing its job and producing its product **correctly the first time**.

At the root of TQM is the definition of what quality is. Quality can mean different things to different people. For a customer it is a product that meets expectations and performs as it is supposed to for a reasonable price. For a production manager it is a product that is within the required specification. When a company is considering quality, it must be certain to include all of these different perspectives of quality from all of the involved parties.

In addition to the cash costs that are lost as a result of poor quality, there is sometimes a large **opportunity cost associated with poor quality**. An opportunity cost is the benefit of the next best use of the resource that was lost. Whenever something is produced poorly, time is spent fixing the initial problem. One of the opportunity costs of poor quality, therefore, is the loss of the time spent fixing something.

There is another cost associated with poor quality management, and it concerns **design quality** failures. Costs of design quality are costs that either prevent poor quality of design or that arise as a result of poor quality of design. Design quality costs include costs to design, produce, market and distribute a product as well as provide service after the sale for poorly designed products. Opportunity costs of lost sales, because the product is not what customers really want, are a significant component of design quality costs.
What are different methods of monitoring quality?

How are quality management and productivity related?

What is the Pareto Principle?

What are the benefits of internal control?
At first glance, it may seem that as a company’s commitment to quality increases, the productivity of the company will decrease. Since productivity is measured as the level of output given an amount of input, it would seem that by allocating resources to quality and spending resources in the quality process, there would be fewer outputs for the level of inputs.

This, however, is not the case. In fact, as a company’s commitment to quality increases, productivity also increases. There are a number of reasons for this, including:

1) A reduction in the number of defective units.
2) A more efficient manufacturing process.
3) A commitment to doing it right the first time.

If a company is to achieve total quality management, it must be able to identify significant quality problems when they occur. Several methods are used to analyze quality problems. These are:

1) Control charts,
2) Histograms,
3) Pareto diagrams, and
4) Cause-and-effect, or Ishikawa (fishbone) diagrams.

A Pareto diagram is a specific type of histogram. Vilfredo Pareto, a 19th-century Italian economist, came up with the now well-known 80-20 observation, or Pareto principle. We know it as “20% of the population causes 80% of the problems,” or “20% of the population is doing 80% of all the good things.” After management pinpoints which 20% of the causes are accounting for 80% of the problems, it can focus efforts on improving the areas that are likely to have the greatest overall impact.

Internal controls are an important part of a company’s overall operations. A strong internal control system will provide many benefits:

1) Lower audit costs.
2) Better control over the assets of the company.
3) Reliable information for use in decision-making.

A company with weak internal controls is putting itself at risk for employee theft, loss of control over the information relating to operations and other damaging inefficiencies to the business.

The Committee of Sponsoring Organizations (COSO) was part of the Treadway Commission. This organization was active in the early 1990s. The sponsoring organizations included the American Institute of Certified Public Accountants, the American Accounting Association, the Institute of Internal Auditors, the Institute of Management Accountants, and the Financial Executives Institute. It developed several reports that have provided the foundation for current work and publications regarding risk management and internal control. Most of the concepts covered in the Risk Assessment, Controls and Risk Management portion of the CMA exam are adapted from the report Internal Control – Integrated Framework developed by the COSO. The report was published in 1992 and is the guide for all internal control systems.
What is the definition of *internal control*?

Who is *responsible* for internal control?

What are the *components* of internal control?

List *factors* that influence the internal control environment of a company.

What are internal control risk *assessment* and risk *management*?

What are the *classifications* of control activities based on when they occur and their objectives?
Responsibility for internal control lies with:

1) The Board of Directors, to oversee the internal control system.
2) The CEO, to provide leadership and direction and to be responsible for the “tone at the top.”
3) Senior managers, who delegate responsibility for establishment of internal policies and procedures.
4) Financial and accounting officers and staff, whose activities are central to the exercise of control.
5) External parties such as independent auditors, who provide information useful to effective internal control.

Note: Internal auditors evaluate the effectiveness of the control systems and contribute to their ongoing effectiveness, but they do not have the primary responsibility for establishing or maintaining the control systems.

Internal control is a process that is carried out by an entity’s board of directors, management, and other personnel that is designed to provide reasonable assurance that objectives in the following three categories will be achieved:

1) Effectiveness and efficiency of operations,
2) Reliability of financial reporting, and
3) Compliance with applicable laws and regulations.

The factors that influence the internal control environment are:

1) The integrity and ethical values of the entity’s people.
2) A commitment to competence.
3) The attention and direction provided by the board of directors and/or audit committee.
4) Management’s philosophy and operating style.
5) The company’s organizational structure provides the framework for planning, executing, controlling and monitoring the activities it pursues to achieve its objectives.
6) The way management assigns authority and responsibility for operating activities.
7) Human resource policies and practices let employees know what levels of integrity, ethical behavior and competence are expected of them.

The five components of an internal control system are:

1) Control Environment: integrity, ethics and management philosophy and operating style.
2) Risk Assessment: identifying, analyzing and managing the risks that have the potential to prevent the organization from achieving its objectives.
3) Control Activities: policies that address the risks, and procedures to ensure the policies are carried out.
4) Information and Communication: reports must contain the information that management needs and must be available in a timely manner.
5) Monitoring: assessing the quality of the internal control system’s performance through ongoing monitoring and through separate evaluations.

A useful mnemonic for easier memorization is CRIME.

Classifications of control activities according to when they occur and their objectives are:

1) Preventive - to avoid the occurrence of an unwanted event. Segregation of duties, authorization of transactions, etc.
2) Detective - to discover an unwanted event that has occurred. Bank reconciliations, checking for missing pre-numbered documents, variance reporting.
3) Directive - to encourage the occurrence of desirable events.
4) Corrective - to correct an undesirable event that has occurred.
5) Compensating - to make up for an internal control weakness by doing more of other controls.

A risk is anything that endangers the achievement of an objective.

Risk assessment is the process of identifying, analyzing and managing risks that have the potential to prevent the organization from achieving its objectives. The company’s objectives must be established before the risks to them can be assessed. Assessment of risk involves determining the dollar value of assets that are exposed to loss, as well as the probability that a loss will occur.

Risks can be external (technological changes, changes in the market, new requirements due to legislative changes, natural disasters, loss of a supplier, criminal acts directed against the business, etc.) or internal (employee embezzlement or other illegal acts by employees, disruption in computer systems, poor management decisions, errors or accidents, etc.).

Management of an identified risk involves actions to reduce the significance or likelihood of the risk occurring.
Why should *pre-numbered* forms be used?

Define *control activities*.

Provide 9 examples of *control activities*.

Why is it important to make *independent checks* and to verify *transactions* and *activities* as part of internal control?

What are some examples of *safeguarding controls*?

Provide 7 examples of *internal control related communication* that should take place in every company.
Control activities are the policies that address the identified risks and procedures that ensure that management directives are carried out, thus helping ensure that the organization’s objectives will be achieved. They are designed to limit risk wherever risk exposure is determined to exist, in order to protect the organization’s ability to achieve its objectives.

Forms should be pre-numbered in order to account for all documents, reducing the likelihood of fraudulent use.

Examples of control activities are:
1) Top level reviews
2) Direct functional or activity management
3) Information processing
4) Independent checks
5) Performance indicators
6) Physical controls to safeguard assets
7) Documents and records
8) Authorization
9) Segregation of duties

Checks performed by someone other than the person responsible for the original operation are generally more effective at assuring that transactions are processed and activities are performed accurately. A “new pair of eyes” will spot mistakes more often than those of the originator of the work.

Examples of internal control communication are:
1) Info. systems must provide reports to appropriate personnel so they can carry out their responsibilities.
2) All personnel need to receive clear communication from top management about the importance of internal control.
3) People need to know standards of behavior that the company expects.
4) Employees need to know that reporting a suspected violation of the company’s code of conduct will not get them into trouble.
5) Senior management must inform board members about performance, new developments, major initiatives, potential risks, and other relevant information.
6) Appropriate communication is needed with those who are outside of the organization such as banks, insurance companies, and customers.
7) Any outsider dealing with the company must be informed that improper actions will not be tolerated.

The most visible safeguarding controls include controls to protect the organization’s assets from losses due to natural disasters like floods and tornadoes.

Safeguarding controls also include physical protection measures to restrict access to assets and documents such as records and blank checks, purchase orders, bank codes, etc., to authorized personnel.

Items must be counted periodically and compared with control records.
Describe two ways that internal control in a company can be *monitored*.

What is *segregation of duties* and what are the *four functions* that must always be performed by different people?

What are the *responsibilities* of the Board of Directors?

What are the *requirements* for a company’s *audit committee*?

What are the *responsibilities* of a company’s *audit committee* as required by the Security and Exchange Commission (SEC)?

What are the *authorities* of the *audit committee*?
Segregation of duties means duties are divided among various employees to reduce the risk of errors or inappropriate activities. This ensures that no single individual is given too much responsibility so that no employee is in a position to both perpetrate and conceal irregularities.

For duties to be segregated, the following four functions must always be performed by different people:

1) **Authorizing** a transaction.
2) **Recording** the transaction, preparing source documents, maintaining journals.
3) Keeping **physical custody** of the related asset, such as receiving checks in payment of receivables.
4) **Periodic reconciliation** of the physical assets to the recorded amounts for those assets.

Monitoring of the company’s internal control can be done in two ways:
1) Through **ongoing monitoring** during normal operations.
2) **Separate evaluations** by management with the assistance of the internal audit function. If monitoring is done regularly during normal operations, it lessens the need for separate evaluations.

Requirements of the company’s audit committee include:

1) Consist of at least three members.
2) All members of the audit committee must be **independent**. Independence means that the members of the audit committee **may not be employed** by the company in any capacity if they serve as members of its audit committee.
3) In addition, the New York Stock Exchange requires a five-year “cooling-off” period for former employees of a listed company, or of its independent auditor, before they can serve on the company’s audit committee.
4) One member of the audit committee must have **accounting or financial management expertise**.
5) **All** members of the audit committee must be financially literate at the time of their appointment or must become financially literate within a reasonable period of time after joining the audit committee.

The **board of directors** is responsible for setting corporate policy and for seeing that the company is operated in the best interest of shareholders. The attention and direction provided by the directors are critical. The board consists of both inside and outside directors who have adequate expertise and are active and involved. Independence from management is critical, so that if necessary, difficult and probing questions will be raised.

In its selection of the management of the company, the board defines what it expects from management in terms of integrity and ethics. It can confirm these expectations through its oversight activities. And by its authority to make certain key decisions, the board sets objectives and performs strategic planning.

By its oversight, the board is involved in all aspects of internal control.

The **authority** of the company’s audit committee includes:

1) Providing for appropriate funding for payment of compensation to the registered public accounting firm employed by the company for the purpose of rendering or issuing an audit report; and to any advisers employed by the audit committee.
2) The authority to investigate any matter.

The **SEC** defines the **responsibilities** of the audit committee as follows:

1) Directly responsible for the appointment, compensation, and oversight of the work of any registered public accounting firm employed by the company.
2) Selecting the external auditor, approving audit fees, supervising the external auditor; overseeing auditor qualifications and independence, discussing with the auditors matters required under generally accepted auditing standards, and reviewing the audit scope, plan and results.
3) Establishing procedures for the receipt, retention, and treatment of complaints received by the company regarding accounting, internal accounting controls, or auditing matters; and the confidential, anonymous submission by employees of the issuer of concerns regarding questionable accounting or auditing matters.”
4) Engaging independent counsel and other advisers, as it determines necessary to carry out its duties.”
What is the *Foreign Corrupt Practices Act* and what are its two main provisions?

When and why was the *Sarbanes Oxley (SOX) Act* implemented and to whom does it apply?

What are the responsibilities of the *Public Company Accounting Oversight Board (PCAOB)*?

What are the major internal control provisions of the *Sarbanes Oxley Act*?

What are the major provisions of *SOX section 302*?

What are the major provisions of *SOX section 404*?
On July 30, 2002, the Sarbanes-Oxley Act of 2002 (called SOX or SarbOx for short) was enacted in response to several incidents of financial reporting fraud and audit failures. This act has been called the most significant securities legislation since 1940. Many of the act's provisions apply to internal control, particularly the provisions regarding the audit committee of the board of directors.

The Sarbanes-Oxley Act applies to all publicly-held companies in the U.S., all of their divisions, and all of their wholly-owned subsidiaries. It also applies to any non-U.S. owned publicly-held multinational company that engages in business in the U.S. A privately-held company may also comply with SOX in preparation for an initial public offering, in preparation for raising private funding, or on a voluntary basis using it as a best practices benchmark.

The Foreign Corrupt Practices Act (FCPA) was enacted in response to disclosures of questionable payments that had been made by large companies. Investigations by the SEC had revealed that over 400 U.S. companies had made questionable or illegal payments in excess of $300 million to foreign government officials, politicians and political parties. The payments were either illegal political contributions or payments to foreign officials that bordered on bribery.

The FCPA has two main provisions:
1) **Antibribery** provisions, which make it illegal to offer or authorize corrupt payments (bribes) to a foreign official or candidate for political office.
2) **Accounting** provisions, which require management to maintain books, records and accounts that accurately reflect transactions, and to develop and maintain a system of accounting control to provide a deterrent to illegal payments.

The major internal control provisions of the Sarbanes-Oxley Act are:
1) **Sections 302** where the responsibilities of the CEO and CFO are listed regarding the integrity of the reported financial results.
2) **Section 404** where the responsibilities are listed of the company's management regarding the development, maintenance, and assessment of the company's internal control processes and procedures.

SOX section 404 contains provisions impacting management and the company's external auditor:

**Company management:**
1) Each annual report required by the SEC contains an assessment by management of the adequacy of the company's internal control over financial reporting
2) Management states it has responsibility for establishing and maintaining an adequate internal control structure and procedures for financial reporting so that material errors in the financial results are prevented or detected in a timely manner
3) The annual report contains an assessment of the effectiveness of the internal control structure and procedures for financial reporting as of the end of its most recent fiscal year

**External auditor:**
1) Report on and attest to management's assessment of the effectiveness of the internal controls.
2) Express an opinion on the effectiveness of the company's internal control over financial reporting.

The major provisions of SOX section 302 relate to the certifications made by the CEO and CFO. These managers confirm:
1) They have reviewed the financial report.
2) The report does not contain any untrue material statement or omit any material fact.
3) Based on their knowledge, the financial statements and all the other related information in the report fairly present in all material respects the financial condition and results of operations of the company for all of the periods presented in the report.
4) They understand they are responsible for establishing and maintaining internal controls, the controls have been evaluated within the previous 90 days, and they have been made aware of all material information related to the company.
5) They have reported on their findings about the effectiveness of their internal controls..
6) They have disclosed to the company's auditors and its audit committee of the board of directors any material issues impacting the internal control environment or any fraud, no matter how material.
What are the two broad principles of SOX section 404?

What is the PCAOB Preferred Approach to Auditing Internal Controls as documented in Auditing Standard No. 5?

Define an audit walkthrough and explain the goals to achieve through it.

According to the PCAOB Auditing Standard 5, what are the 6 steps to follow in a top-down approach to auditing the company's internal controls over financial reporting?

What are examples of entity level controls?

List and describe the financial statement assertions that are important for the audit process.
PCAOB Auditing Standard No. 5 calls for a top-down, risk-based approach to assessing and attesting to internal controls.

SOX section 404 is organized around two broad principles:
1) Management should determine whether it has implemented controls that adequately address the risk that a material misstatement of the financial statements would not be prevented or detected in a timely manner.
2) Management’s evaluation of evidence about the operation of its controls should be based on its assessment of risk.

According to PCAOB standard 5 the steps to follow in a top-down approach to auditing are:
1) Identify entity-level controls.
2) Identify significant accounts and disclosures and their relevant assertions.
3) Understand likely sources of misstatement.
4) Select controls to test.
5) Test design effectiveness and operating effectiveness of the controls.
6) Evaluate identified deficiencies.

A walkthrough is an audit procedure whereby the auditor follows a single transaction from its origination all the way through the company’s processes, including information system, until it is reflected in the company’s financial records. The auditor uses the same documents and information technology that company personnel use.

The objectives of a walkthrough are to:
1) Obtain a complete understanding of the flow of transactions and to determine the points in the process at which misstatements could occur
2) Confirm the auditor’s understanding of the design of controls in the process
3) Evaluate the effectiveness of the design of controls
4) Determine whether controls have been placed in operation.

Financial statement assertions that are important for the audit process are:
1) Existence or occurrence - whether assets/liabilities exist at a given date; and whether recorded transactions have occurred during a given period.
2) Completeness - whether all transactions and accounts that should be presented in the financial statements are included.
3) Valuation or allocation - whether the assets, liabilities, revenues, and expenses of an entity have been included in the financial statements at the appropriate amounts in conformity with GAAP.
4) Rights and obligations - whether, at a given date, all assets are the rights of the entity and all liabilities are the obligations of the entity.
5) Presentation and disclosure - whether financial statement components have been properly classified, described, and disclosed.

Examples of entity-level controls are:
1) Controls that are related to the control environment.
2) Controls over management override.
3) The company’s risk assessment process.
4) Centralized processing controls.
5) Controls to monitor results of operations.
6) Controls to monitor other controls.
7) Controls over the period-end financial reporting process.
8) Policies that address significant business control and risk management practices.
List and explain possible indicators of a potential material weakness in the internal controls of a company.

What is included in SEC release 3-8810 regarding audits of internal control and what is the general categories of guidance that are included therein?

What are the limitations of internal controls?

What is the definition of internal auditing and what services does it provide to management and the audit committee?

What are the three fundamental categories of internal audit services?

What is the scope of internal auditing, i.e., what is included, and what is not included?
SEC Release 33-8810, the guidance for management in assessing its internal control over financial reporting, contains information about how a risk-based, top-down approach to assessing internal control over financial reporting (abbreviated as "ICFR") should be performed. The guidance covers 4 main categories:

1) Identify financial reporting risks and controls.
2) Evaluate evidence of the operating effectiveness of ICFR.
3) Include all of its locations or business units.
4) Evaluate control deficiencies.

Indicators of material weakness include:

1) **Identification of fraud**, whether or not material, on the part of senior management.
2) **Restatement of previously issued financial statements** in order to correct a material misstatement.
3) Identification by the auditor of a **material misstatement of financial statements in the current period**, if the circumstances of the misstatement indicate that it would not have been detected by the company’s internal control over financial reporting.
4) **Ineffective oversight by the company’s audit committee** over the company’s external financial reporting and over its internal control over financial reporting.

The Institute of Internal Auditors, the U.S. professional organization of internal auditors, has defined internal auditing as:

"an independent, objective assurance and consulting activity designed to add value and improve an organization’s operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control and governance processes."

An effective internal audit function provides to management and the audit committee a means of monitoring the reliability of financial reporting and the organization’s control over operations. This monitoring of control over operations includes the effectiveness and efficiency of operations as well as its compliance with applicable laws and regulations.

Internal controls cannot provide a guarantee that the entity will achieve its financial reporting operational and compliance objectives. Internal control has limitations including simple human error or faulty judgments; and controls can be circumvented through collusion and well-planned fraud. Because of this, internal control can provide only reasonable assurance to management and the board of directors regarding achievement of the entity’s objectives.

Also, internal controls must be evaluated in terms of the cost-benefit relationship. The cost of the operations of the controls should be less than the benefit that is derived from them. This will lead to some controls not being implemented and a company accepting some amount of risk simply because the cost of the necessary controls (in time, money, or both) are too great.

**The internal audit function should encompass** every part of the organization’s operations. What the internal audit function does is great in scope, but their responsibilities have specific limits.

Internal auditors are responsible for reviewing and appraising policies, procedures, plans and records for the purpose of informing and advising management.

Internal auditors do not have any authority or responsibility over operating activities. The internal auditors make recommendations but have no authority over or responsibility for the activities they audit or for the implementation of their recommendations.

Internal auditing services fall into three fundamental categories:

1) **Operational** – reviewing the various functions within the organization in order to appraise the efficiency and economy of operations and the effectiveness with which the functions achieve their objectives.
2) **Financial** – reviewing the economic activity of the organization as it is measured and reported by accounting methods.
3) **Compliance** – reviewing both financial and operating controls and transactions to determine whether they conform to laws, standards, regulations and procedures.
What are the responsibilities of the internal audit function?

What are internal audit’s responsibilities with respect to the company’s internal control system?

What are organizational independence and objectivity of the internal audit function?

What are differences regarding the responsibilities of internal and external auditors?

What are the five guidelines governing the usage of work from the internal audit department by the external auditors?

List and explain the two basic types of services provided by internal auditors.
Internal auditors' responsibilities with respect to the internal control system include:

1) Testing individuals’ compliance with controls to determine whether policies and procedures are being followed.
2) Evaluation of the adequacy and effectiveness of the control system.
3) Examination and evaluation of the reliability and integrity of financial and operating information.
4) Reviewing systems to determine whether the organization is in compliance with policies, plans, procedures, and regulations.
5) Examination and evaluation of the effective and efficient use of an entity's resources.
6) Reviewing the method of safeguard assets and verifying the existence of those assets.
7) Furnishing analyses, appraisals, recommendations, counsel and information to management to assist them in the discharge of their responsibilities.

The responsibility of the internal auditor is to review and appraise policies, procedures, plans and records for the purpose of informing and advising management.

Internal auditors do not have any authority or responsibility over operating activities. If they had this responsibility, it would impair any independence and objectivity the internal auditors may have in working in these areas because they would in essence be auditing themselves.

The responsibility of internal audit ends with the making of recommendations. Auditors should have no authority over or responsibility for the activities they audit or the implementation of their recommendations. It is the responsibility of the board or management to implement the recommendations brought to them by the internal auditors.

The external auditors, or independent auditors, perform the financial statement audit. Their responsibility is to issue an opinion on the accuracy and fairness of management’s assertions regarding the financial statements. The external auditor focuses on the financial accounting system and those activities that have a direct, material effect upon the financial statements.

The external auditors are also responsible for performing an audit of management's assessment of the effectiveness of internal control over financial reporting.

The responsibility of internal auditors, on the other hand, is to compare “what is” in the company with “what should be” in the company and report their findings to management.

In addition to their findings, the internal auditor develops and communicates suggestions and recommendations for improvement.

Organizational independence means that the internal audit function should not have any direct relationships with the various departments it will be auditing. Reporting directly to the board of directors achieves this organizational independence.

Objectivity means that the internal auditor will act without bias. For example, an internal auditor should not be in the position of auditing an operation over which that particular auditor was previously responsible, unless it has been one year or more since the auditor was responsible for that activity.

Internal auditors perform two basic types of services: assurance services and consulting services.

Assurance services involve performing an objective examination of evidence for the purpose of providing an independent assessment on governance, risk management, and control processes for the organization.

Consulting services are advisory and other related client service activities. Usually they are performed at the request of the client, and their nature and scope are agreed upon with the client. They are intended to add value and improve an organization’s governance, risk management, and control processes without the internal auditor assuming management responsibility.

Work done by internal auditors to test internal financial controls can be valuable to external auditors, subject to the following guidelines:

1) The internal auditors must not direct the external audits of the organization’s financial statements or management’s control over financial reporting.
2) Before relying on the work of internal auditors, the external auditors must review and test the work performed by the internal auditors.
3) In the assessment of audit risk and in the performance of the audit, the internal auditor will not make any decisions or conclusions.
4) The work of the internal and external auditors should be coordinated to reduce the amount of duplicate work by both parties.
5) Because the internal auditors are a related party to the company, the external auditor will supervise any work done by the internal auditor as part of the external audit.
List 6 examples of assurance services that are provided by internal auditors.

What is a financial audit that is performed by internal auditing and what are its objectives?

What is an internal operational audit and what are its objectives?

What is an audit of financial controls, as performed by the internal audit department, and what are its objectives?

What is an internal compliance audit and what are its objectives?

Define consulting services, as performed by the internal audit department, and what are some examples?
The purpose of an internal **financial audit** is to analyze the economic activity of an entity as measured and reported by accounting methods. It is **not** the same as the purpose of an independent, external audit of the financial statements. A financial audit performed by an **internal** auditor is not performed for the purpose of issuing an opinion on the fairness of the financial statements. Instead a financial audit performed by internal auditing is usually done on one specific area of the organization. The goal is to confirm whether appropriate financial assertions can be proved related to this limited area.

**Examples of assurance services** provided by internal auditors include:

1. Financial
2. Performance (or operational)
3. Audit of financial controls
4. Compliance
5. System security
6. Due diligence

An **audit of financial controls** involves examining two aspects of financial internal controls:

1. Controls over financial resources.
2. Controls over the accounting for financial resources.

Internal auditors are concerned with the accountability of the assets. At all times, someone should be responsible for them and there should be periodic checks of the existence and condition of those assets. Protection is needed against risks such as fire, flood and other natural disasters.

The purpose of an **operational audit** (or performance audit) is examining and evaluating systems of internal control, overall company operations and the quality of performance in carrying out assigned responsibilities. In order to assess these items, a company must have a standard level of behavior or output, or something that is to be achieved. Auditors will then compare the results of the operations with these standards.

The focus of an operational audit is on the three E’s - efficiency, effectiveness and economy. The main techniques for the auditor in an operational audit are financial analysis, the observation of departmental activities and questionnaire interviews of employees.

In addition, as part of an operational audit, the internal auditor will make recommendations about how to improve the process or operation.

Consulting services are advisory and other related client service activities. Usually they are performed at the request of the client, and their nature and scope are agreed upon with the client. They are intended to **add value and improve** an organization’s governance, risk management, and control processes without the internal auditor assuming management responsibility. Examples include counsel, advice, facilitation, and training.

Some examples of consulting services are:

1. **Quality audit** – evaluating the quality of the company product or service
2. **Special Engagements** – An example of a special engagement is a **fraud audit**. Fraud audits are performed for the purpose of discovering the presence, scope and means of either misappropriation of assets or fraudulent reporting.

The purpose of a **compliance audit** is to determine to what degree an organization is operating in an orderly way, effectively and visibly conforming to certain specific requirements of its policies, procedures, standards, or laws and governmental regulations. To perform a compliance audit, the auditor must know exactly what policies, procedures, standards, etc., are required.

In a compliance audit, the internal auditor is not interested only in the compliance or lack of compliance, but in case of noncompliance, he will also determine the cause of the noncompliance, the cost of the noncompliance and what needs to be done in order to be in compliance.

The causes of noncompliance may be faulty procedures, changes in the conditions related to the regulation, or perhaps simply mistakes and lack of review or supervision.
What are 8 criteria to use to decide which internal audit engagements to perform?

What are 4 considerations when planning the internal audit as defined by internal auditing standard 2201?

What are 4 considerations for establishing objectives for the audit as per internal auditing standard 2210?

What is audit risk and what are the types of risk that are used to assess audit risk?

What are 3 reasons to understand the company internal controls during the audit planning process?

What is flowcharting when used by an internal auditor?
According to Internal Auditing Standard 2201, the internal auditor considers the following factors when planning the engagement:

1) The objectives of the activity being reviewed and the means by which the activity controls its performance.

2) The significant risks to the activity, its objectives, resources, and operations and the means by which the potential impact of risk is kept to an acceptable level.

3) The adequacy and effectiveness of the activity’s risk management and control processes compared to a relevant control framework or model.

4) The opportunities for making significant improvements to the activity’s risk management and control processes.

Factors to consider when deciding to perform an internal audit include:

1) Risk to the business as defined by the company chief audit executive

2) The length of time since the last audit was performed in the potential area

3) Requests from senior management, the audit committee or other governing bodies

4) An audit’s relation to the external audits of financial statements and management control over financial reporting

5) Changing circumstances in the business, operations, programs, systems or controls

6) Changes in the risk environment or control procedures in a given department

7) The potential benefit that could be achieved from the engagement

8) Changes in the skills of the available staff, because new skills may enable the internal audit activity to conduct different types of engagements.

Audit risk (AR) is the risk that an auditor will give an unqualified opinion when in reality there are one or more material misstatements. The risk of a material misstatement is calculated by the multiplication of three other risk factors:

1) **Inherent risk** (IR) is the risk that is natural in an element of the financial statements, assuming that there are no controls.

2) **Control risk** (CR) is the risk that an internal control will not prevent or detect a material misstatement in a timely manner.

3) **Detection risk** (DR) is the risk that an auditor will not detect a material misstatement in the financial statements through audit testing.

Audit risk is calculated as follows:

\[
AR = IR \times CR \times DR
\]

In establishing the objectives for the audit, Internal Auditing Standard 2210 states that internal auditors must:

1) Conduct a preliminary assessment of the risks relevant to the activity under review. Audit objectives must reflect the results.

2) Consider the probability of significant errors, fraud, noncompliance, and other exposures when developing the audit objectives.

3) Ascertain the extent to which management has established criteria to determine whether objectives for the activity have been accomplished. If adequate, internal auditors must use such criteria in their evaluation. If inadequate, internal auditors must work with management to develop appropriate evaluation criteria.

4) Address governance, risk management, and control processes during consulting audits to the extent agreed upon with the client.

Flowcharting is a method of documenting the internal auditor’s understanding of the company’s internal controls by describing them in a flowchart. A flowchart also enables the auditor to identify areas in which internal controls are required and necessary for the company.

The main elements that are shown in a flowchart are:

1) Data sources (where the information comes from).

2) Data destinations (where the information goes).

3) Data flows (how the data gets there).

4) Transformation process (what happens to the data).

5) Data storage (how the data is stored for the long term).

The auditor should understand the company internal controls during the audit planning process in order to:

1) Identify the types of potential misstatements that may occur in whatever he or she is auditing.

2) Consider the factors that relate to the risk of material misstatements.

3) Design the substantive tests that will be performed. The internal controls that are in place and operating effectively will impact the nature, timing and extent of the substantive tests that the auditor will perform.
What are the two types of flowcharts used by internal auditors?

What is the internal audit program?

List and describe the 4 standards of audit evidence.

What are the 8 types of audit evidence?

Define accounting controls and administrative controls.

What is the objective of an audit of controls?
The audit program is part of the planning for each audit engagement or project. The audit program details the work to be accomplished, how it will be done and what is to be done.

The audit program should include information about the objectives of the area that is being audited, the risk assessment and a description of the controls that are in place as well as those that need to be in place in order to achieve the area's objectives. These area objectives in turn determine the objectives of the audit. The audit program then includes the procedures to be carried out to reach the objectives of the audit.

Audit evidence can be classified according to legal rules of evidence. The types include:
1) **Direct** evidence is evidence that was acquired directly by the party offering it.
2) **Hearsay** evidence is a secondhand account where the witness does not have personal, direct knowledge of what occurred but heard it from someone else.
3) **Documentary** evidence is any original record, deed, contract or written instrument that documents a transaction.
4) **Opinion** is not generally considered useful evidence. However, occasionally experts’ opinions are used in areas that are beyond the knowledge of most people.
5) **Circumstantial** is evidence that is consistent with a particular inference.
6) **Secondary** evidence is evidence that is not the original documentation.
7) **Corroborative** evidence supports other evidence.
8) **Conclusive evidence** is evidence that is indisputable.

An audit of controls has the following objectives to determine whether:
1) Controls are in place.
2) The controls that are in place are structurally sound.
3) The controls are designed to achieve a specific management objective, to achieve compliance with predetermined requirements, or to ensure accuracy and propriety of transactions.
4) The controls are being used properly.
5) The controls are efficiently serving their purpose.
6) The controls are effective.
7) Management is using the output of the control system.

The two main types of flowcharts are:
1) A **systems**, or horizontal flowchart, shows the different departments or functions involved in a process, horizontally across the top. It documents the manual processes as well as the computer processes and the input, output and processing steps. It identifies specific control points in the system. A control point is a point in a process where an error or irregularity is likely to occur, creating a need for control. This type of flowchart clearly shows the segregation of duties.
2) A **program**, or vertical flowchart, depicts the specific steps in a process and how they will be executed. It does not, however, usually show the system components as clearly as a horizontal flowchart. This type of flowchart is not used much now, as it has been replaced by other more effective techniques.

The 4 standards of audit evidence are: **sufficient, competent, relevant and useful**:
1) **Sufficient** means enough information that another person would come to the same conclusions as the auditor. Sufficient evidence is adequate in both quantity and quality to allow the auditor to reach a conclusion.
2) **Competent** means that the information is reliable and the best available, given the means used.
3) **Relevant** means that the information supports the findings and is consistent with the audit objectives. To be relevant, the facts must have a logical relationship to whatever they are being used to prove or disprove.
4) **Useful** means that it is helping the organization meet its goals. Evidence that meets the tests of being sufficient, competent and relevant is useful evidence.

Accounting controls are concerned with the integrity and accuracy of the accounting system and the financial reports being generated, as follows:
1) **Completeness**: Are all of the transactions reflected in or captured by the accounting system?
2) **Validity**: Are only valid transactions recorded?
3) **Authorization**: Are all transactions properly authorized?
4) **Accuracy**: Are reported numbers accurate representations of the economic transactions that have occurred?

Administrative controls are more focused on management's operating objectives. For example, outside salespeople might be required to submit reports on how many customer calls they make each week. This is a control over the operating goal of providing good customer service and increasing sales, but it has no direct control effect on the reported accounting numbers.
What should the auditor investigate when testing compliance with controls?

What are 4 types of control testing that an auditor performs and the amount of audit evidence that results from each type of test?

What are 2 factors to consider when determining whether a control deficiency represents a material weakness in the company’s internal controls?

List 6 risk factors to consider to judge whether a control breakdown could result in a misstatement of an account balance or disclosure.

What is the role of internal audit in the detection and prevention of fraud?

What are the factors that contribute to fraud in a company?
Procedures the auditor performs to test operating effectiveness of controls include a mix of tests. Some types of tests produce greater evidence of the effectiveness of the controls than other tests.

Here are the tests that an auditor might perform in order of the evidence they would usually produce, from least evidence to most evidence:

1) Inquiry of appropriate personnel
2) Observation
3) Inspection of relevant documentation
4) Re-performance of a control

Inquiry alone does not provide sufficient evidence to support a conclusion about the effectiveness of a control.

Testing controls over a greater period of time provides more evidence of the effectiveness of the controls than testing over a shorter period of time does.

Risk factors affect whether there is a reasonable possibility that a deficiency or a combination of deficiencies will result in a misstatement of an account balance or disclosure. These risk factors include:

1) The nature of the impacted financial statement accounts, disclosures, and assertions.
2) The susceptibility of the related asset or liability to loss or fraud, or how likely it is that something could go wrong.
3) The subjectivity, complexity, or extent of judgment required to determine the amount involved.
4) The interaction or relationship of the control with other controls, including whether they are interdependent or redundant.
5) The interaction of the deficiencies, i.e., if there is more than one, could they in combination cause a material misstatement.
6) The possible future consequences of the deficiency.

Some of the factors contributing to fraud are insufficient internal controls in general. Specifically, these are:

1) No segregation of duties.
2) Not limiting the access to assets.
3) Failing to compare existing assets with recorded assets.
4) Executing transactions without proper authorization.
5) Lack of personnel or qualified personnel that leads to improper controls.
6) Collusion among employees.
7) The existence of high-value, small, liquid assets.
8) The ability of management to override the controls in place.

The auditor should investigate the following to test compliance with controls and evaluate their effectiveness:

1) Are procedures being followed?
2) Is the output being used?
3) Is the input into the system valid, accurate, and reasonable?
4) If the system is computerized, is it operating properly?
5) Is the output of the control operation valid?
6) Is the output achieving management’s objective in establishing the control?
7) Is the control system operating as intended?
8) Does the control system have the necessary required characteristics?

If an internal auditor identifies a deficiency in a control over financial reporting, the auditor should evaluate the severity of the deficiency to determine whether the deficiency, either individually or in combination with other deficiencies, represents a material weakness as of the date of the management assessment.

The severity depends upon:

1) Whether there is a reasonable possibility that the company’s controls will fail to prevent or detect a misstatement of an account balance or disclosure; and
2) The magnitude of the potential misstatement resulting from the deficiency or deficiencies.

The internal auditor is responsible for examining the controls in place to determine whether they are adequate to prevent or detect fraud. Although the internal auditor is responsible for examining for fraud, he or she is not responsible for preventing fraud.
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<th>Question</th>
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<td>What are the <em>main points</em> of the IIA’s pronouncement on fraud?</td>
<td><strong>What are the three main types of <em>fraud</em> in a company?</strong></td>
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<td>What is a <em>major risk factor</em> leading to fraudulent financial reporting?</td>
<td><strong>What should an auditor who <em>suspects fraud</em> do?</strong></td>
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<td>What is included in an <em>internal audit report</em>?</td>
<td><strong>How should internal audit <em>oral reports</em> and <em>interim reports</em> be delivered?</strong></td>
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The **three main types of fraud** are:

1) **Misstatements arising from fraudulent financial reporting**, including intentional misstatements in the financial statements that are made to mislead users, such as omission of information from the financial statements of the misapplication of accounting principles.

2) **Misstatements arising from the misappropriation of assets** (stealing), including theft, embezzlement or any action that causes the company to expend cash for things that will not benefit the company.

3) **Corruption**, including bribes, kickbacks, conflicts of interest and other things that prevent an employee from acting fully and morally on the behalf of the company.

The main points of the IIA’s pronouncement about fraud entitled *Deterrence, Detection, Investigation and Reporting of Fraud* are:

1) The deterrence of fraud is the responsibility of management.

2) Internal auditors must have sufficient knowledge to be able to identify the indicators that fraud may have occurred.

3) If control weaknesses are detected, additional tests should be performed to identify other factors of fraud that may be present.

4) Audit procedures alone will not guarantee that fraud will be detected.

5) A fraud that is detected needs to be reported.

According to *Professional Standards Bulletin 83-5*, when an **internal auditor suspects fraud**, he should determine the possible effects and discuss the matter with the appropriate level of management which should then initiate an investigation.

When wrongdoing is suspected, the auditor’s responsibility extends to the appropriate level of management within the organization. It is generally not the auditor’s duty to report this to individuals outside of the organization, although they may in some cases need to report this event to the SEC, a predecessor auditor, a court or to a governmental agency.

A major risk factor that could indicate possible fraudulent financial reporting is the occurrence of **management override of controls**. Studies have shown that in cases of fraudulent financial reporting, management has been able to repeatedly override systems of internal accounting control.

**Oral reports** should supplement written reports, but cannot replace them. The advantages of oral reports are timeliness, developing the relationship between the auditor and the auditee through increased and informal communication, and enabling the auditee to point out any errors in the logic or understanding by the auditor.

**Interim reports** are issued during the audit whenever there is something that needs to be addressed immediately, such as a need to change the scope of the audit, or simply keep people informed when the audit process is a long one.

All **audit reports must include** the **purpose**, the **scope**, the **results** and (if appropriate) **an opinion**. This is very similar to the items that are included in an external auditor’s report.

In addition to these items, a report may also include any of the following items:

1) Background information and summaries,

2) The status of findings from previous audits,

3) Recommendations of potential improvements,

4) Acknowledgment of good performance and corrective actions taken, and

5) Comments from the department that was audited.
What is included in the *purpose section* of the audit report?

What is included in the *scope section* of the audit report?

What is included in the *results section* of the audit report?

How should the audit report be *reviewed* and *distributed*?

What *types of incidents* should be reported to management by an internal auditor?

What is the role of the auditor in respect to *follow-up*?
The scope section of the audit report is a description of how much work was done to achieve the engagement’s objectives. This section outlines what was done on the engagement, including:

1) The activities that were reviewed.
2) The time period reviewed (if appropriate).
3) Any related activities that were not reviewed.
4) The nature and extent of the work performed.

The scope of the engagement should specifically state what areas were not covered by the audit that readers would expect to be covered by the audit unless told differently.

The scope of the engagement must include consideration of relevant systems, records, personnel, and physical properties, including those under the control of third parties.

The auditor outlines the audit objectives (this must always be included in the report) in the purpose section of the audit report. Here you may also report why the engagement was performed and what the expected results were from the engagement (i.e., cost savings, increased efficiencies, etc.). The audit objective should be described in enough detail so that readers will know what to expect from the rest of the report. The objectives should be spelled out, and then the findings should address themselves to each statement in the objectives.

The engagement’s objectives also should address the risks, controls and governance processes associated with the activities under review.

It is a courtesy to let the auditee review the audit report before it is sent to the supervisors. This review also allows the auditee to identify any inaccuracies in the report.

The auditor needs to lead the meeting with the auditee. In no circumstances will the auditor allow the auditee to write or change the report. Notes should be kept from any review meeting, with records of any conflicts or disagreements, including resolution.

The report should be distributed to everyone who has direct interest in it. This includes executives to whom internal audit reports, persons responsible for the activities or operations audited, and those who will need to take corrective action as a result of the audit.

The report should include a list of people to whom it was distributed and who reviewed it during the draft stage.

IIA Standards require that internal auditors follow up on the actions taken by the company regarding any deficiencies found. The auditor should determine that either corrective action has been taken, or management has assumed the risk of not taking corrective action.

In following up, the auditor should receive all of the responses from the auditees to the audit, evaluate if those replies are adequate and then be certain that actions are actually taken to correct the problems. In order to ensure that the actions have been taken, the auditor may need to do additional testing after the correction has been put into place.

This results section of the audit report includes the observations, conclusions (or opinions if appropriate), recommendations and action plans from the engagement.

1) Observations are the relevant statements of fact, or audit findings, discovered during the engagement.
2) Conclusions are the internal auditor’s evaluations of the effects of the observations and recommendations on the activities that were reviewed.
3) The report should include recommendations for improved performance, acknowledgement of satisfactory performance and any action plans for corrective actions that need to be implemented.

Examples of incidents that should be reported include but are not limited to:

1) Fraud.
2) Violation of any law, such as environmental regulations.
3) In a quality audit, inconsistent product quality.
4) A situation in which no control failure has occurred, no illegal activity is going on, and no accounting errors have occurred may also be a reportable situation in certain circumstances, if a finding indicates that the achievement of a company goal is being endangered.
List 8 examples of computerized audit techniques.

What is an audit trail, why is it important, and what happens to audit trails when transactions are processed by computers?

What are the goals of internal control in an information system?

What are some of the threats to information systems and data that systems controls can address?

What are the two types of systems controls?

What are the four major classifications of general systems controls?
The existence of an **audit trail** means that an amount appearing in a general ledger account can be verified by evidence supporting all the individual transactions that go into the total. The audit trail includes all of the documentary evidence for the transaction and the control techniques that the transaction was subjected to in order to provide assurance that the transaction was properly authorized and properly processed.

When an audit trail is absent, the reliability of an accounting information system is questionable. Because of the nature of computerized transaction processing systems, paper audit trails may exist for only a short period of time, as support documents may be periodically deleted.

**Internal auditors** use the **specialized techniques** to evaluate the processing being done by the computer and the **computer controls** that are in place. There are a variety of tools that auditors can use to audit information systems including:

1) Generalized Audit Software
2) Test Data
3) Integrated Test Facility
4) Parallel Simulation
5) Embedded Audit Routines
6) Extended Records and Snapshots
7) Tracing
8) Mapping

**Threats** to information systems and data include:

1) Errors in system design.
2) Errors can occur in input or input manipulation.
3) Data can be stolen over the Internet.
4) Data and intellectual property, including trade secrets, can be stolen by employees.
5) Unauthorized alterations can be made to programs by programmers adding instructions that divert assets to their own use.
6) Data and programs can be damaged.
7) Data can be altered directly in the data file without recording any transaction that can be detected.
8) Viruses, Trojan Horses, and worms can infect a system, causing a system crash, stealing data, or damaging data.
9) Hardware can be stolen.
10) Physical facilities and the data maintained in them can be damaged by natural disasters, illegal activity or sabotage.

Even though a company may use computers extensively in its operations and accounting systems, this does not change the fundamental goals of and need for internal controls in that system. Internal control for an information system has the same goals as overall organizational internal control:

1) Promoting effectiveness and efficiency of operations in order to achieve the company’s objectives.
2) Maintaining the reliability of financial reporting through checking the accuracy and reliability of accounting data.
3) Assuring compliance with all laws and regulations that the company is subject to, as well as adherence to managerial policies.
4) Safeguarding assets.

The four major classifications of **general systems controls** are:

1) The **organization and operation of the computer facilities**, including provision for segregation of duties within the data processing function as well as segregation of the data processing function from other operations.
2) **General operating procedures**, including written procedures and manuals.
3) **Equipment and hardware controls**, including controls installed in computers that can identify incorrect data handling or improper operation of the equipment.
4) **Access controls to equipment and data**, such as controls over physical access to the computer system and the data that are adequate to protect the equipment and data files from damage or theft.

The two types of systems controls are **general controls**, which relate to the environment, and **application controls**, which are specific to individual applications and are designed to prevent, detect and correct errors and irregularities in transactions during the input, processing and output stages.
CMA Part 1
Section D: Internal Controls

What are the three major classifications of application controls and what are their purposes?

Segregation of duties in a computer facility is what kind of control?

What equipment and hardware controls should a computer facility have?

What are some procedures for protecting programs and databases from unauthorized use?

What are some procedures for limiting access to physical hardware in an information system?

List examples of segregation of duties from other departments outside the IS department as an example of a general computer control.
Segregation of duties in a computer center is a general control which is concerned with organization and operation of the computer facilities.

Logical security consists of access and ability to use the equipment and data. It protects programs and data from unauthorized use. It includes Internet security (firewalls) and virus protection procedures; access controls for users to minimize actions they can perform; authentication processes to verify the identity of users; and cryptographic techniques.

Unauthorized personnel, dial-up connections and other system entry ports should be prevented from accessing computer resources. Passwords should be changed regularly for all those authorized to access the data. Procedures should be established for issuing, suspending and closing user accounts, and access rights should be reviewed periodically.

All passwords should be issued with levels of authority that permit the users to access only the data that they need to be able to access in order to do their jobs.

The major classifications of application controls include:
1) Input controls.
2) Processing controls.
3) Output controls.

Application controls are designed to prevent, detect, and correct errors in transactions as they flow through the input, processing, and output stages of work.

Equipment and hardware controls in a computer facility include:
1) A defined backup procedure should be in place, and the usability of the backups should be verified regularly.
2) Transaction trails should be available for tracing the contents of any individual transaction record backward or forward, and between output, processing, and source. Records of all changes to files should be maintained.
3) Statistics on data input and other types of source errors should be accumulated and reviewed to determine remedial efforts needed to reduce errors.

The most important organizational and operating general control is the segregation of duties. There are specific duties in the IT environment that should be separate from one another.

IS department personnel should be separated from the departments and personnel that they support (called “users”). This means:
1) Users initiate and authorize all systems changes, and a formal written authorization is required.
2) Asset custody remains with the user departments.
3) An error log is maintained and referred to the user for correction. The data control group follows up on errors.

Physical security involves things such as keeping servers and associated peripherals in a secure room; password protection for servers; monitoring of hardware components to prevent them from being removed from the premises; security for offsite backup tapes; and biometrics to identify a person based on physical or behavioral characteristics (fingerprints, voice verification, etc.).

Media library contents should be protected. Contents of the media library should be inventoried systematically, so any discrepancies can be remedied and the integrity of magnetic media is maintained. Policies and procedures should be established for archiving.

Dual access and dual control should be established to require two independent, simultaneous actions before processing is permitted.
List examples of segregation of duties from other departments within the IS department as an example of a general computer control.

List 3 reasons for implementing systems development controls at the beginning of the system development process, and describe the goals of these controls.

What are the 7 stages of system development where controls should be considered for implementation?

List examples of physical access controls for computer facilities.

List examples of computer hardware controls for networks.

List examples of file security and storage controls.
Controls are instituted at the beginning of the systems development process for several reasons including:

1) To ensure that all changes are properly authorized and are not made by individuals who lack sufficient understanding of control procedures, proper approvals and the need for adequate testing.
2) To prevent errors in the resulting system that could cause major data processing errors.
3) To limit the potential for a myriad of other problems during the development process and after its completion.

Implementing systems development controls during the development stage of an information system enhance the ultimate accuracy, validity, safety, security and adaptability of the new system’s input, processing, output and storage functions.

Effective segregation of duties should be instituted by separating the **authority** for and the **responsibility** within the IS function. Examples include:

1) **Systems analysts** should not do programming, nor should they have access to hardware, software or data files.
2) **Programmers** should not have the authority, opportunity or ability to make any changes in master records or files.
3) **Computer operators** should not have programming functions and should not be able to modify any programs.
4) The **data control group** should be **organizationally independent of computer operations**.
5) **Data conversion operators** should have no access to the library or to program documentation, nor should they have any input/output control responsibilities.
6) **Librarians** should have no access to equipment. The librarian should restrict access to the data files and programs to authorized personnel at scheduled times.

The computer processing center should be in a locked area and access to it should be restricted. Some means of accomplishing this goal are:

1) Have company personnel wear color-coded ID badges with photos. People authorized to enter the computer area are assigned an ID badge of a particular color.
2) With magnetic ID cards, each employee’s entry into and exit from the computer center can be automatically logged.
3) The door can be kept locked. No one can enter unless “buzzed” in by the control person.
4) Keys may be issued to authorized personnel, or combination locks can be used to limit access.
5) The location of the computer center should also be in a place where it is protected from natural disasters as much as possible.
6) The computer center should be equipped with smoke and water detectors, fire suppression devices, burglar alarms and monitored surveillance cameras.

There are where controls should be considered for 7 stages in the system development process or implementation:

1) Statement of Objectives Stage
2) Investigation and Feasibility Study Stage
3) Systems Analysis Stage
4) Systems Design and Development Stage
5) Program Coding and Testing Stage
6) Systems Implementation Stage
7) Systems Evaluation and Maintenance Stage

File Security and storage controls include:

1) **Labeling the contents** of discs (CDs, DVDs, external hard drives, etc.), tapes, flash drives, and any other removable media, both externally and internally.
2) **Read-only** file designation is used to stop users from altering or writing over data.
3) **Database Management Systems** use **lockout procedures** to prevent two applications from updating the same record or data item simultaneously.
4) The **librarian’s function** is particularly critical, because documentation, programs and data files are assets of the organization and require protection the same as any other asset would.
5) **Protection of program documentation** is critical. Data can be changed within a file only by someone who knows how to do it.

Computer networks require special controls due to the decentralized nature of the hardware. Examples include:

1) **Checkpoint processing** should be used to enable recovery in case of a system failure.
2) **Routing verification procedures** protect against transactions routed to the wrong computer network system address.
3) **Message acknowledgment procedures** can prevent the loss of part or all of a transaction or message on a network.
What is the *focus* of application controls?

List *examples of problems* that application controls can prevent, detect and correct.

What are *input controls* in an information system and why are they necessary?

What are *processing controls* and why are they necessary?

What are *output controls* and why are they necessary?

What are the *risks* of using the Internet for data transmission instead of using secure transmission lines?
Some examples of problems that adequate controls can prevent, detect and correct include:

1) Input loss can occur when transaction information is transmitted from one location to another.
2) Input duplication can occur if an input item is thought to be lost and is recreated, but the original item is subsequently found or was never actually lost.
3) Inaccurate input in the form of typographical errors in numbers or in spelling.
4) Unrecorded transactions can occur as accidental failures or can be the result of theft or embezzlement.
5) In a volume processing environment, management authorization of every individual transaction may not take place, allowing improper transactions to occur.
6) Output can be sent to the wrong people, or may be sent too late to be used.
7) Programming errors or clerical errors can result in incomplete processing.

Application controls focus on preventing, detecting and correcting errors in transactions as they flow through the input, processing and output stages of work in an information system.

Processing controls are controls designed to provide reasonable assurance that processing has occurred properly and that no transactions have been lost or incorrectly added.

Processing controls prevent or discourage the improper manipulation of data and ensure satisfactory operation of hardware and software.

Input controls are the controls designed to provide reasonable assurance that data entered into the system has proper authorization, has been converted to machinesensible form and has been entered accurately. Input controls can also provide some assurance that data has not been lost, suppressed, added or changed.

Input is the stage where there is the most human involvement and, as a result, the risk of errors is higher than in the processing and output stages. Most errors in systems are the result of input errors. If information is not entered correctly, the output will be useless. Effective input controls are vital.

The three classifications of input controls are:

1) Data observation and recording.
2) Data transcription.
3) Edit tests.

Output controls are used to provide reasonable assurance that input and processing has resulted in valid output.

Output controls include:

1) Validating processing results, such as comparing proof listings against batch control totals, performing reconciliations, reviewing error logs and reviewing the output for accuracy, and
2) Printed output controls, such as physical control over company checks.

Risks of using the Internet for data transmission instead of secure transmission lines include:

1) Electronic eavesdropping.
2) Computer viruses, trojan horses and worms.
3) Intrusions into the telephone company lines and the company’s computer network.
4) Network integrity violations.
5) Privacy violations.
6) Industrial espionage.
7) Unauthorized use, access, modification, and destruction of hardware, software, data or network resources.
8) Unauthorized release of information (credit card numbers, social security numbers, identity theft).
9) Unauthorized copying of software and other copyright infringement.
10) Denying an end user access to his or her own hardware, software, data or network resources (Denial Of Service - DOS - attacks).
11) Use of a computer or network resources to illegally obtain information or property.
What is a firewall and what is it used for?

What is data encryption and why is it needed when using the Internet?

What backup (storage) controls should be used and why?

What is a disaster recovery plan and why is it needed?

What should a disaster recovery plan include?

(BLANK)
Encryption is the best protection against traffic interception resulting in data leaks and possible corruption of data. Encryption converts data into a code, and then a key is required to convert the code back to data. Unauthorized people can receive the coded information, but without the proper key, cannot read it. Thus, an attacker may be able to see where the traffic came from and where it went, but not the content.

The encryption process can be either in the hardware or in the software.

There are two methods of software encryption: secret key and public key/private key.

A firewall is the best defense against port scans. It serves as a barrier between the internal and the external networks and prevents unauthorized access to the internal network. A good firewall, properly configured, makes a computer’s ports invisible to port scans.

In addition to protecting a computer from incoming probes, a firewall can also prevent backdoor applications, Trojan horses and other unwanted applications from sending data from the computer.

A firewall can be in the form of software directly installed on a computer; or it can be a piece of hardware that is installed between the computer and its connection to the Internet.

An organization should have a formal disaster recovery plan to fall back on in the event of a hurricane, fire, earthquake, flood, or criminal or terrorist act.

The objective of a disaster recovery plan is to minimize the extent of disruptions, damages and losses, and to temporarily establish alternative means of processing information.

It is essential that the company have plans for the backup of data and the recovery of data:
1) Program and data files should be backed up regularly.
2) Copies of all transaction data should be stored as a transaction log as they are entered into the system. If the master file is destroyed during processing, the data transaction log can be reprocessed against the backup copy.
3) Backups should be stored at a secure, remote location. In the event data is destroyed due to a physical disaster, it can be reconstructed.
4) Grandparent-parent-child processing should be used. If a file is damaged during updating, the previous files can be used to reconstruct a new current file.
5) Fault-Tolerant Systems are systems designed to tolerate faults or errors. They often utilize redundancy in hardware design, so that if one system fails, another one will take over.
6) Computers should be on Uninterruptible Power Supplies (UPS) to provide some protection during a power failure.

A disaster recovery plan should include:
1) Which employees will participate in disaster recovery and what their responsibilities will be.
2) What hardware, software, and facilities will be used.
3) The priority of applications that should be processed.
4) Arrangements for alternative facilities as a disaster recovery site and offsite storage of the company’s databases. An alternative facility might be a different facility owned by the company; or it might be a facility contracted by a different company. The different locations should be a good distance away from the original processing site.

Disaster recovery sites may be either hot sites or cold sites. A hot site is a backup facility that has a computer system similar to the one used regularly and is fully operational and immediately available. A cold site is a facility where power and space are available to install processing equipment, but it is not immediately available.
Define *business ethics*.

List 7 situations where business ethics standards can distinguish between *desirable and undesirable* behavior.

List examples of *external and internal* factors that may encourage *unethical behavior* in business.

What are the IMA’s *four overarching ethical principles*, and how are the principles defined?

What are the *four standards* of ethical conduct for a member of the IMA?

What *responsibility* do members of the IMA have with respect to *competence*?
Standards of business ethics distinguish between desirable and undesirable behavior and actions in relation to the following:

1) General understanding of what is considered to be right or wrong,
2) Compliance with laws and regulations, both external and internal,
3) Resolution of conflicts,
4) Conflict of interest,
5) Whistle-blowing,
6) Bribes and kickbacks, and
7) Social responsibilities.

**Ethics** concerns the morality of activities and practices that are considered right or wrong, including the rules and values that give rise to those activities and practices. Thus, business ethics is a systematic study of morality as it is applied to the business world.

**Business ethics** are considered an integral part of business and are usually officially incorporated into the culture of a company in one manner or another. This may be done very formally through the use of Value or Mission Statements, or informally through peer pressure and the culture that is set by the management team through their behavior.

The IMA’s four overarching ethical principles are:

1) **Honesty** - the quality of being upright, having integrity, truthfulness, sincerity, frankness, and freedom from deceit or fraud.
2) **Fairness** - being free from bias, dishonesty or injustice.
3) **Objectivity** - the state of being unbiased, free from personal feelings or prejudice; basing analyses and decisions on the facts alone.
4) **Responsibility** - the state of being answerable or accountable for something within one’s power, control, or management.

Note: These definitions are not in the IMA’s Statement of Ethical Professional Practice, but it is our understanding that if you mention any of these overarching ethical principles in an answer to an ethics question, you will be expected to define them when you use them.

With respect to **competence**, IMA members have a responsibility to:

1) Maintain an appropriate level of professional expertise by continually developing knowledge and skills.
2) Perform professional duties in accordance with relevant laws, regulations, and technical standards.
3) Provide decision support information and recommendations that are accurate, clear, concise, and timely.
4) Recognize and communicate professional limitations or other constraints that would preclude responsible judgment or successful performance of an activity.

The four standards of ethical conduct for a member of the IMA are:

1) **Competence**
2) **Confidentiality**
3) **Integrity**
4) **Credibility**

There are external and internal factors that may encourage unethical behavior.

1) **On the individual level**, the personal judgment of an employee often depends on his or her personal life experience, educational background and social status.
2) **On the organizational level**, organization-specific features such as management style, group dynamics, remuneration/promotion systems and practices, performance evaluation, budgeting and reporting processes as well as overall condition of the business, are all important factors impacting the behavior of individuals.
3) **Outside of the organization**, external pressures and influences such as those of competitors, investors, partners, customers, governments (especially in a different country) and other stakeholders may compel individuals to compromise their ethical standards.
What responsibility do members of the IMA have with respect to confidentiality?

What responsibility do members of the IMA have with respect to integrity?

What responsibility do members of the IMA have with respect to credibility?

If your organization’s policies do not resolve an ethical conflict, what is an action to consider, as listed first in the Statement of Ethical Professional Practice?

If your organization’s policies do not resolve an ethical conflict, what are two actions to consider, as listed second and third in the Statement of Ethical Professional Practice?
With respect to **integrity**, IMA members have a responsibility to:

1) Mitigate actual conflicts of interest; regularly communicate with business associates to avoid apparent conflicts of interest. Advise all parties of any potential conflicts.

2) Refrain from engaging in any conduct that would prejudice carrying out duties ethically.

3) Abstain from engaging in or supporting any activity that might discredit the profession.

With respect to **confidentiality**, IMA members have a responsibility to:

1) Keep information confidential except when disclosure is authorized or legally required.

2) Inform all relevant parties regarding appropriate use of confidential information. Monitor subordinates' activities to ensure compliance.

3) Refrain from using confidential information for unethical or illegal advantage.

If established organization policies do not resolve the ethical conflict, you should consider the following course of action (number 1 of 3):

1) Discuss the issue with your immediate supervisor except when it appears that the supervisor is involved. In that case, present the issue to the next level. If you cannot achieve a satisfactory resolution, submit the issue to the next management level. If your immediate superior is the chief executive officer or equivalent, the acceptable reviewing authority may be a group such as the audit committee, executive committee, board of directors, board of trustees, or owners. Contact with levels above the immediate superior should be initiated only with your superior's knowledge, assuming he or she is not involved. Communication of such problems to authorities or individuals not employed or engaged by the organization is not considered appropriate, unless you believe there is a clear violation of the law.

With respect to **credibility**, IMA members have a responsibility to:

1) Communicate information fairly and objectively.

2) Disclose all relevant information that could reasonably be expected to influence an intended user's understanding of the reports, analyses, or recommendations.

3) Disclose delays or deficiencies in information, timeliness, processing, or internal controls in conformance with organization policy and/or applicable law.

If established organization policies do not resolve the ethical conflict, you should consider the following courses of action (numbers 2 and 3 of 3):

2) Clarify relevant ethical issues by initiating a confidential discussion with an IMA Ethics Counselor or other impartial advisor to obtain a better understanding of possible courses of action.

3) Consult your own attorney as to legal obligations and rights concerning the ethical conflict.