**Stat test bank: Chapter 1:**

1) Interviews, statistical sampling, and company reports provide input data for quantitative analysis models.

Answer: TRUE

2) In the early 1900s, Henry Ford pioneered the principles of the scientific approach to management.

Answer: FALSE

3) Managers do not need to be familiar with the limitations, assumptions, and/or specific applicability of the quantitative analysis technique to use it for accurate decision making.

Answer: FALSE

4) During World War II, many new scientific and quantitative techniques were developed to assist the military, and these developments were so successful that many companies started using similar techniques in managerial decision making and planning after the war.

Answer: TRUE

5) When a problem is difficult to quantify, it may be necessary to develop unspecific objectives.

Answer: FALSE

6) The Quantitative Analysis Approach consists of six steps.

Answer: FALSE

7) A mathematical model shows the relationship between quantifiable and non-quantifiable information.

Answer: FALSE

8) Decision variables may also be called parameters.

Answer: FALSE

9) Model variables can be controllable or uncontrollable.

Answer: TRUE

10) A series of steps or procedures that are repeated is known as an algorithm.

Answer: TRUE

11) A model is a representation of a situation.

Answer: TRUE

12) A parameter is a measurable quantity that may vary or is subject to change.

Answer: FALSE

14) All problems can be solved by considering only the quantitative issues.

Answer: FALSE

15) A profit equation is an example of a schematic model.

Answer: FALSE

16) Testing the data and model should be done before the results have been analyzed.

Answer: TRUE

17) Sensitivity analysis helps us estimate the effect of known and unknown errors in our model.

Answer: TRUE

18) Models can help us analyze a problem and sell a decision to those who must implement it.

Answer: TRUE

A sensitivity analysis allows a manager to answer the "what if" questions.

Answer: TRUE

20) One problem in using a quantitative model is that the necessary data may be unavailable.

Answer: TRUE

21) Which of the following terms is interchangeable with quantitative analysis?

A) management science

22) Operations Research is known as

C) the science of better

23) Who is credited with pioneering the principles of the scientific approach to management?

D) Frederick W. Taylor

24) A(n) \_\_\_\_\_\_\_\_ is a representation of reality or a real-life situation.

B) model

25) A measurable quantity that may vary, or is subject to change, and can be controlled is known as a(n)

A) decision variable.

26) A set of logical and mathematical operations performed in a specific sequence is called a(n)

C) algorithm.

27) The ability to examine the variability of a solution due to changes in the formulation of a problem is an important part of the analysis of the results. This type of analysis is called \_\_\_\_\_\_\_\_ analysis.

A) sensitivity

28) Which of the following is not one of the steps in the quantitative analysis approach?

C) Observing a hypothesis

29) The condition of improper data yielding misleading results is referred to as

A) garbage in, garbage out.

30) Expressing profits through the relationship among unit price, fixed costs, and variable costs is an example of

B) a quantitative analysis model.

31) The widespread applicability of operations research methods to business followed which war?

C) World War II

32) Which of the following statement(s) are true regarding the advantages of mathematical modeling?

E) All of the above

33) A measurable quantity that is inherent in the problem is called a(n)

D) parameter.

34) Trying various approaches and picking the one that results in the best decision is called

A) the trial-and-error method.

35) Models that do not involve risk or chance are

C) deterministic models

36) If input data are accurate to three significant digits, then the solution results can be accurate to how many significant digits?

C) three

37) Postoptimality analysis is most closely associated with

C) sensitivity analysis.

38) The break-even point is an example of a

B) quantitative analysis model.

39) Stochastic models are synonymous with

E) None of the above

40) A controllable variable is also called a

B) decision variable.

**Stat test bank chapter 3:**

1) Expected monetary value (EMV) is the average or expected monetary outcome of a decision if it can be repeated a large number of times.

Answer: TRUE

2) Expected monetary value (EMV) is the payoff you should expect to occur when you choose a particular alternative.

Answer: FALSE

3) The decision maker can control states of nature.

Answer: FALSE

4) All decisions that result in a favorable outcome are considered to be good decisions.

Answer: FALSE

5) The difference in decision making under risk and decision making under uncertainty is that under risk, we think we know the probabilities of the states of nature, while under uncertainty we do not know the probabilities of the states of nature.

Answer: TRUE

6) EVPI (expected value of perfect information) is a measure of the maximum EMV as a result of additional information.

Answer: TRUE

7) When using the EOL as a decision criterion, the best decision is the alternative with the largest EOL value.

Answer: FALSE

8) To determine the effect of input changes on decision results, we should perform a sensitivity analysis.

Answer: TRUE

9) The maximax decision criterion is used by pessimistic decision makers and maximizes the maximum outcome for every alternative.

Answer: FALSE

10) The maximin decision criterion is used by pessimistic decision makers and minimizes the maximum outcome for every alternative.

Answer: FALSE

11) Optimistic decision makers tend to discount favorable outcomes.

Answer: FALSE

12) The decision theory processes of maximizing expected monetary value (EMV) and minimizing expected opportunity loss (EOL) should lead us to choose the same alternatives.

Answer: TRUE

13) The several criteria (maximax, maximin, equally likely, criterion of realism, minimax regret) used for decision making under uncertainty may lead to the choice of different alternatives.

Answer: TRUE

14) A decision table is sometimes called a payout table.

Answer: TRUE

15) The nodes on decision trees represent either decisions or states of nature.

Answer: TRUE

16) Any problem that can be presented in a decision table can also be graphically portrayed in a decision tree.

Answer: TRUE

17) Any problem that can be represented in a decision tree can be easily portrayed in a decision table.

Answer: FALSE

18) In a decision table, all of the alternatives are listed down the left side of the table, while all of the possible outcomes or states of nature are listed across the top.

Answer: TRUE

19) The EMV approach and Utility theory always result in the same choice of alternatives.

Answer: FALSE

20) Utility theory may help the decision maker include the impact of qualitative factors that are difficult to include in the EMV model.

Answer: TRUE

32) An analytic and systematic approach to the study of decision making is referred to as

C) decision theory.

33) What makes the difference between good decisions and bad decisions?

C) A good decision considers all alternatives.

34) Expected monetary value (EMV) is

A) the average or expected monetary outcome of a decision if it can be repeated a large number of times.

35) Which of the following is not considered a criteria for decision making under uncertainty?

D) random selection

36) A pessimistic decision making criterion is

C) maximin.

37) Which of the following is true about the expected value of perfect information?

C) It is calculated as expected value with perfect information minus maximum EMV.

38) Which of the following is not a characteristic of a good decision?

E) always results in a favorable outcome

39) The following is a payoff table giving profits for various situations.



What decision would an optimist make?

B) Alternative 2

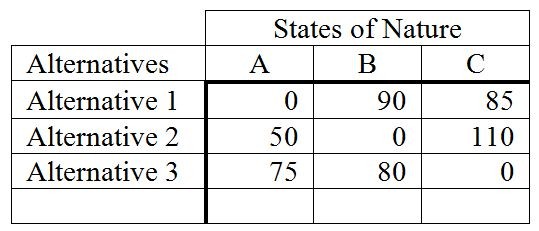
40) The following is a payoff table giving profits for various situations.



What decision would a pessimist make?

A) Alternative 1

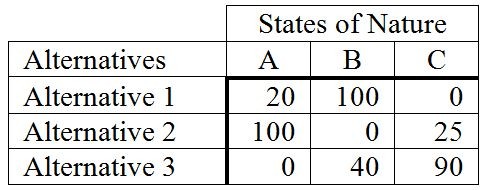
41) The following is an opportunity loss table.



What decision should be made based on the minimax regret criterion?

1. Alternative 3

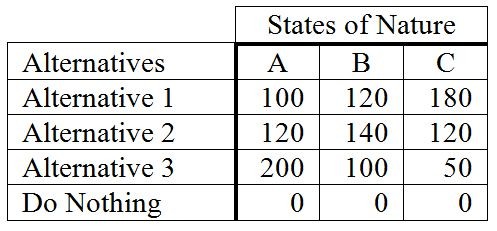
45) The following is an opportunity-loss table.



The probabilities for the states of nature A, B, and C are 0.3, 0.5, and 0.2, respectively. If a person were to use the expected opportunity loss criterion, what decision would be made?

C) Alternative 3

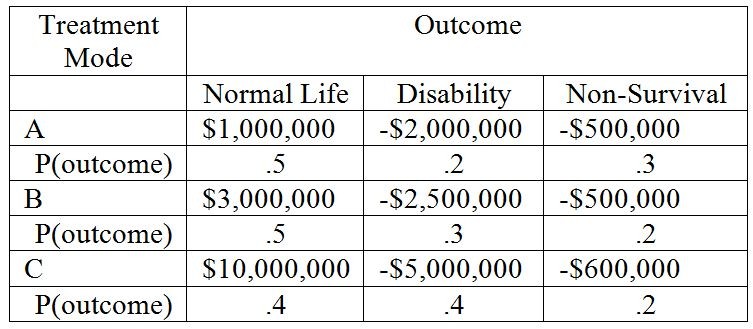
46) The following is a payoff table giving profits for various situations.



The probabilities for states of nature A, B, and C are 0.3, 0.5, and 0.2, respectively. If a person selected Alternative 1, what would the expected profit be?

C) 126

47) Dr. Mac, a surgeon, must decide what mode of treatment to use on Mr. Samuels. There are three modes of treatment: Mode A, B, and C; and three possible states of nature: 1.Treatment succeeds and patient leads a normal life, 2. Patient survives treatment but is permanently disabled, and 3. Patient fails to survive treatment. Dr. Mac has prepared the decision table below. What mode of treatment maximizes the expected value?



C) Mode C

8) Consider the following payoff table.



Based upon these probabilities, a person would select Alternative 2. Suppose there is concern about the accuracy of these probabilities. It can be stated that Alternative 2 will remain the best alternative as long as the probability of A is at least

A) 0.33.

49) Consider the following payoff table.



How much should be paid for a perfect forecast of the state of nature?

B) 30

50) The following is a payoff table giving profits for various situations.



The probabilities for states of nature A, B, and C are 0.3, 0.5, and 0.2, respectively. If a perfect forecast of the future were available, what is the expected value with this perfect information?

C) 166

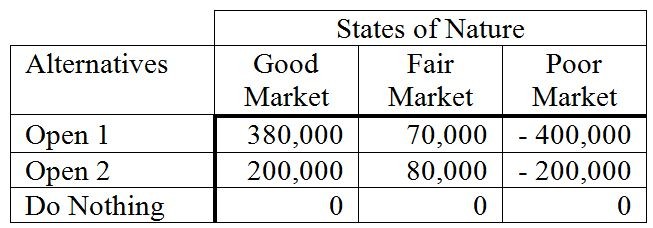
51) The following is a payoff table giving profits for various situations.



The probabilities for states of nature A, B, and C are 0.3, 0.5, and 0.2, respectively. If a perfect forecast of the future were available, what is the expected value of perfect information (EVPI)?

C) 36

52) Nick has plans to open some pizza restaurants, but he is not sure how many to open. He has prepared a payoff table to help analyze the situation.



As Nick does not know how his product will be received, he assumes that all three states of nature are equally likely to occur. If he uses the equally likely criterion, what decision would he make?

B) Open 2

**Stat test bank chapter 4:**

1) In regression, an independent variable is sometimes called a response variable.

Answer: FALSE

2) One purpose of regression is to understand the relationship between variables.

Answer: TRUE

3) One purpose of regression is to predict the value of one variable based on the other variable.

Answer: TRUE

4) The variable to be predicted is the dependent variable.

Answer: TRUE

5) The dependent variable is also called the response variable.

Answer: TRUE

6) A scatter diagram is a graphical depiction of the relationship between the dependent and independent variables.

Answer: TRUE

7) In a scatter diagram, the dependent variable is typically plotted on the horizontal axis.

Answer: FALSE

8) There is no relationship between variables unless the data points lie in a straight line.

Answer: FALSE

9) In any regression model, there is an implicit assumption that a relationship exists between the variables.

Answer: TRUE

10) In regression, there is random error that can be predicted.

Answer: FALSE

11) Estimates of the slope, intercept, and error of a regression model are found from sample data.

Answer: FALSE

12) Error is the difference in the actual value and the predicted value.

Answer: TRUE

13) The regression line minimizes the sum of the squared errors.

Answer: TRUE

14) In regression, a dependent variable is sometimes called a predictor variable.

Answer: FALSE

15) Summing the error values in a regression model is misleading because negative errors cancel out positive errors.

Answer: TRUE

16) The SST measures the total variability in the dependent variable about the regression line.

Answer: FALSE

17) The SSE measures the total variability in the independent variable about the regression line.

Answer: FALSE

18) The SSR indicates how much of the total variability in the dependent variable is explained by the regression model.

Answer: TRUE

19) The coefficient of determination takes on values between -1 and + 1.

Answer: FALSE

20) The coefficient of determination gives the proportion of the variability in the dependent variable that is explained by the regression equation.

Answer: TRUE

50) Which of the following statements is true regarding a scatter diagram?

B) It is a plot of the independent and dependent variables.

51) The random error in a regression equation

B) includes both positive and negative terms.

52) Which of the following statements (are) is not true about regression models?

C) The error is found by subtracting the actual data value from the predicted data value.

D) The dependent variable is the explanatory variable

مكتوب الجواب سي و دي

53) Which of the following equalities is correct?

A) SST = SSR + SSE

54) The sum of squared error (SSE) is

C) a measure in the variation of *Y* about the regression line.

55) If computing a causal linear regression model of *Y* = a + b*X* and the resultant *r*2 is very near zero, then one would be able to conclude that

B) Y = a + bX is not a good forecasting method.

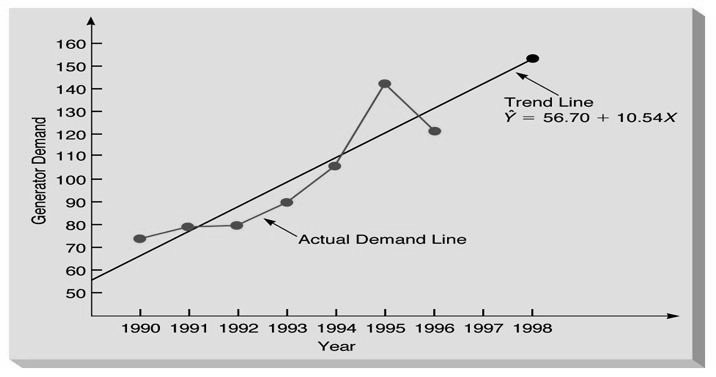
56) Which of the following statements is true about *r*2?

B) It is also called the coefficient of determination.

57) The coefficient of determination resulting from a particular regression analysis was 0.85. What was the slope of the regression line?

D) There is insufficient information to answer the question.

58) The diagram below illustrates data with a



C) positive correlation coefficient.

59) The correlation coefficient resulting from a particular regression analysis was 0.25. What was the coefficient of determination?

C) 0.0625

60) The coefficient of determination resulting from a particular regression analysis was 0.85. What was the correlation coefficient, assuming a positive linear relationship?

C) 0.922

61) Which of the following is an assumption of the regression model?

A) The errors are independent.

62) Which of the following is not an assumption of the regression model?

E) The errors should have a standard deviation equal to one.

63) In a good regression model the residual plot shows

C) a random pattern.

64) The problem of nonconstant error variance is detected in residual analysis by which of the following?

A) a cone pattern

65) The problem of a nonlinear relationship is detected in residual analysis by which of the following?

B) an arched pattern

66) The mean square error (MSE) is

D) the SSE divided by the degrees of freedom.

67) Which of the following represents the underlying linear model for hypothesis testing?

C) *Y* = *β*0 + *β*1 *X* + ε

68) Which of the following statements is false concerning the hypothesis testing procedure for a regression model?

C) The null hypothesis is rejected if the adjusted *r*2 is above the critical value.

69) Suppose that you believe that a cubic relationship exists between the independent variable (of time) and the dependent variable *Y*. Which of the following would represent a valid linear regression model?

A) *Y* = *b*0 + *b*1 *X*, where *X* = time3

**Stat test bank chapter 5:**

1) A medium-term forecast typically covers a two- to four-year time horizon.

Answer: FALSE

2) Regression is always a superior forecasting method to exponential smoothing, so regression should be used whenever the appropriate software is available.

Answer: FALSE

3) The three categories of forecasting models are time series, quantitative, and qualitative.

Answer: FALSE

4) Time-series models attempt to predict the future by using historical data.

Answer: TRUE

5) Time-series models rely on judgment in an attempt to incorporate qualitative or subjective factors into the forecasting model.

Answer: FALSE

6) A moving average forecasting method is a causal forecasting method.

Answer: FALSE

7) An exponential forecasting method is a time-series forecasting method.

Answer: TRUE

8) A trend-projection forecasting method is a causal forecasting method.

Answer: FALSE

9) Qualitative models produce forecasts that are little better than simple guesses or coin tosses.

Answer: FALSE

10) The most common quantitative causal model is regression analysis.

Answer: TRUE

11) Qualitative models attempt to incorporate judgmental or subjective factors into the forecasting model.

Answer: TRUE

12) A scatter diagram is useful to determine if a relationship exists between two variables.

Answer: TRUE

13) The Delphi method solicits input from customers or potential customers regarding their future purchasing plans.

Answer: FALSE

14) The naïve forecast for the next period is the actual value observed in the current period.

Answer: TRUE

15) Mean absolute deviation (MAD) is simply the sum of forecast errors.

Answer: FALSE

16) Time-series models enable the forecaster to include specific representations of various qualitative and quantitative factors.

Answer: FALSE

17) Four components of time series are trend, moving average, exponential smoothing, and seasonality.

Answer: FALSE

18) The fewer the periods over which one takes a moving average, the more accurately the resulting forecast mirrors the actual data of the most recent time periods.

Answer: TRUE

19) In a weighted moving average, the weights assigned must sum to 1.

Answer: FALSE

20) A scatter diagram for a time series may be plotted on a two-dimensional graph with the horizontal axis representing the variable to be forecast (such as sales).

Answer: FALSE

32) Which of the following is not classified as a qualitative forecasting model?

A) exponential smoothing

33) A judgmental forecasting technique that uses decision makers, staff personnel, and respondent to determine a forecast is called

B) the Delphi method.

34) Which of the following is considered a causal method of forecasting?

E) None of the above

35) A graphical plot with sales on the *Y* axis and time on the *X* axis is a

A) catter diagram.

36) Which of the following statements about scatter diagrams is true?

D) The variable to be forecasted is placed on the y-axis.

37) Which of the following is a technique used to determine forecasting accuracy?

E) mean absolute percent error

38) A medium-term forecast is considered to cover what length of time?

B) 1 month to 1 year

39) When is the exponential smoothing model equivalent to the naïve forecasting model?

C) α = 1

40) Enrollment in a particular class for the last four semesters has been 120, 126, 110, and 130. Suppose a one-semester moving average was used to forecast enrollment (this is sometimes referred to as a naïve forecast). Thus, the forecast for the second semester would be 120, for the third semester it would be 126, and for the last semester it would be 110. What would the MSE be for this situation?

B) 230.67

41) Which of the following methods tells whether the forecast tends to be too high or too low?

E) bias

42) Assume that you have tried three different forecasting models. For the first, the MAD = 2.5, for the second, the MSE = 10.5, and for the third, the MAPE = 2.7. We can then say:

E) None of the above

43) Which of the following methods gives an indication of the percentage of forecast error?

C) MAPE

44) Daily demand for newspapers for the last 10 days has been as follows: 12, 13, 16, 15, 12, 18, 14, 12, 13, 15 (listed from oldest to most recent). Forecast sales for the next day using a two-day moving average.

A) 14

45) As one increases the number of periods used in the calculation of a moving average,

B) less emphasis is placed on more recent data.

46) Enrollment in a particular class for the last four semesters has been 122, 128, 100, and 155 (listed from oldest to most recent). The best forecast of enrollment next semester, based on a three-semester moving average, would be

E) 127.7.

47) Which of the following methods produces a particularly stiff penalty in periods with large forecast errors?

B) MSE

48) Sales for boxes of Girl Scout cookies over a 4-month period were forecasted as follows: 100, 120, 115, and 123. The actual results over the 4-month period were as follows: 110, 114, 119, 115. What was the MAD of the 4-month forecast?

C) 7

49) Sales for boxes of Girl Scout cookies over a 4-month period were forecasted as follows: 100, 120, 115, and 123. The actual results over the 4-month period were as follows: 110, 114, 119, 115. What was the MSE of the 4-month forecast?

E) None of the above

50) Daily demand for newspapers for the last 10 days has been as follows: 12, 13, 16, 15, 12, 18, 14, 12, 13, 15 (listed from oldest to most recent). Forecast sales for the next day using a three-day weighted moving average where the weights are 3, 1, and 1 (the highest weight is for the most recent number).

D) 14.0

51) Daily demand for newspapers for the last 10 days has been as follows: 12, 13, 16, 15, 12, 18, 14, 12, 13, 15 (listed from oldest to most recent). Forecast sales for the next day using a two-day weighted moving average where the weights are 3 and 1 are

A) 14.5.

52) Which of the following is not considered to be one of the components of a time series?

C) variance

**Stat test bank chapter 6**:

1) Inventory is such an expensive asset that it may account for as much as 50 percent of a firm's invested capital.

Answer: TRUE

2) The same ratio of marginal loss to the sum of marginal loss and marginal profit is used to solve one-period inventory models for both discrete and continuous probability distributions.

Answer: TRUE

3) In the decoupling function, some inventory may be stored between each production process to act as a buffer.

Answer: TRUE

4) Service level is the chance, measured in percent, that there will be a stockout.

Answer: FALSE

5) A stockout is a situation that occurs when there is no inventory on hand.

Answer: TRUE

6) The concept of inventory is applicable to both manufacturing and service organizations.

Answer: TRUE

7) One reason inventory is required is the uneven flow of resources through a company.

Answer: TRUE

8) Inventory is any stored resource that is used to satisfy a current or future need.

Answer: TRUE

9) Economic order quantity (EOQ) analysis has recently become practical as a consequence of high-speed computers.

Answer: FALSE

10) Inventory is the common thread that ties all the functions and departments of the organization together.

Answer: TRUE

11) The purpose of the EOQ model is to achieve a balance between the cost of holding inventory and the cost of stockouts.

Answer: FALSE

12) Under the assumptions made to develop the EOQ model, average inventory is one-half of the maximum inventory.

Answer: TRUE

13) The EOQ model is relatively insensitive to minor violations of the basic assumptions.

Answer: TRUE

14) The production run model is useful when a firm purchases inventory that is delivered over a period of time.

Answer: TRUE

15) The two fundamental decisions that you have to make when controlling inventory are: (1) how much to order, and (2) how much money to spend.

Answer: FALSE

16) The economic order quantity helps one estimate the optimal number of units to purchase with each order.

Answer: TRUE

17) The reorder point occurs during a stockout.

Answer: FALSE

18) Safety stock is ignored when computing the reorder point.

Answer: FALSE

19) In a quantity discount model, the purchase cost or material cost must be included in the total cost calculation.

Answer: TRUE

20) Theft is one of the "ordering cost factors."

Answer: FALSE

28) Inventory

E) All of the above

29) Which of the following is not a use of inventory?

D) the translucent function

30) In making inventory decisions, the purpose of the basic EOQ model is to

C) minimize the sum of carrying costs and ordering costs.

31) Which of the following is not considered a significant inventory cost?

A) cost of production labor

32) Which of the following is part of the determination of EOQ?

D) annual demand

33) Which of the following factors is (are) not included in ordering cost?

B) obsolescence

34) Which of the following factors is (are) not included in carrying cost?

D) inspecting incoming inventory

35) Mark Achin sells 3,600 electric motors each year. The cost of these is $200 each, and demand is constant throughout the year. The cost of placing an order is $40, while the holding cost is $20 per unit per year. There are 360 working days per year and the lead-time is 5 days. If Mark orders 200 units each time he places an order, what would his total ordering cost be for the year?

D) $720

36) The annual demand for a product has been projected at 2,000 units. This demand is assumed to be constant throughout the year. The ordering cost is $20 per order, and the holding cost is 20 percent of the purchase cost. The purchase cost is $40 per unit. There are 250 working days per year. Currently, the company is ordering 500 units each time an order is placed. Assuming the company uses a safety stock of 20 units resulting in a reorder point of 60 units, what is the expected lead-time for delivery?

B) 5 days

37) The objective of a(n) \_\_\_\_\_\_\_\_ system is to reduce costs by integrating all of the operations of a firm.

B) ERP

38) As the service level increases,

A) carrying cost increases at an increasing rate.

39) R. C. Barker makes purchasing decisions for his company. One product that he buys costs $50 per unit when the order quantity is less than 500. When the quantity ordered is 500 or more, the price per unit drops to $48. The ordering cost is $30 per order and the annual demand is 7,500 units. The holding cost is 10 percent of the purchase cost. If R. C. orders 500 units each time he places an order, what would the total annual holding cost be?

B) $1,200

40) Which of the following is not an assumption for the basic EOQ model?

A) Only an integer number of orders can be made each year.

41) For the basic EOQ model, which of the following relationships is not true?

D) The average dollar level of inventory equals unit price multiplied by order quantity.

42) The EOQ model without the instantaneous receipt assumption is commonly called the

D) production run model.

43) Which of the following is not a potential drawback of an ERP system?

E) It does not incorporate inventory control decisions.

44) Sensitivity analysis of EOQ refers to

B) analysis of how much the EOQ will change if different input values are used.

45) Which of the following is not a benefit of a well-developed ERP system?

A) It is relatively inexpensive to customize.

46) The annual demand for a product has been projected at 2,000 units. This demand is assumed to be constant throughout the year. The ordering cost is $20 per order, and the holding cost is 20 percent of the purchase cost. Currently, the purchase cost is $40 per unit. There are 250 working days per year. Whenever an order is placed, it is known that the entire order will arrive on a truck in 6 days. Currently, the company is ordering 500 units each time an order is placed. What is the total holding cost for the year using this policy?

B) $2,000

47) Mark Achin sells 3,600 electric motors each year. The cost of these is $200 each, and demand is constant throughout the year. The cost of placing an order is $40, while the holding cost is $20 per unit per year. There are 360 working days per year and the lead-time is 5 days. If Mark orders 200 units each time he places an order, what would his average inventory be (in units)?

A) 100

48) Andre Candess manages an office supply store. One product in the store is computer paper. Andre knows that 10,000 boxes will be sold this year at a constant rate throughout the year. There are 250 working days per year and the lead-time is 3 days. The cost of placing an order is $30, while the holding cost is $15 per box per year. How many units should Andre order each time?

A) 200

**Stat test bank chapter 7:**

1) Management resources that need control include machinery usage, labor volume, money spent, time used, warehouse space used, and material usage.

Answer: TRUE

2) In the term linear programming, the word programming comes from the phrase "computer programming."

Answer: FALSE

3) One of the assumptions of LP is "simultaneity."

Answer: FALSE

4) Any linear programming problem can be solved using the graphical solution procedure.

Answer: FALSE

5) An LP formulation typically requires finding the maximum value of an objective while simultaneously maximizing usage of the resource constraints.

Answer: FALSE

6) There are no limitations on the number of constraints or variables that can be graphed to solve an LP problem.

Answer: FALSE

7) Resource restrictions are called constraints.

Answer: TRUE

8) One of the assumptions of LP is "proportionality."

Answer: TRUE

9) The set of solution points that satisfies all of a linear programming problem's constraints simultaneously is defined as the feasible region in graphical linear programming.

Answer: TRUE

10) An objective function is necessary in a maximization problem but is not required in a minimization problem.

Answer: FALSE

11) In some instances, an infeasible solution may be the optimum found by the corner point method.

Answer: FALSE

12) The rationality assumption implies that solutions need not be in whole numbers (integers).

Answer: FALSE

13) The solution to a linear programming problem must always lie on a constraint.

Answer: TRUE

14) In a linear program, the constraints must be linear, but the objective function may be nonlinear.

Answer: FALSE

15) Resource mix problems use LP to decide how much of each product to make, given a series of resource restrictions.

Answer: FALSE

16) The existence of non-negativity constraints in a two-variable linear program implies that we are always working in the northwest quadrant of a graph.

Answer: FALSE

17) In linear programming terminology, "dual price" and "sensitivity price" are synonyms.

Answer: FALSE

18) Any time that we have an isoprofit line that is parallel to a constraint, we have the possibility of multiple solutions.

Answer: TRUE

19) If the isoprofit line is not parallel to a constraint, then the solution must be unique.

Answer: TRUE

20) When two or more constraints conflict with one another, we have a condition called unboundedness.

Answer: FALSE

23) A widely used mathematical programming technique designed to help managers and decision making relative to resource allocation is called \_\_\_\_\_\_\_\_.

A) linear programming

24) Typical resources of an organization include \_\_\_\_\_\_\_\_.

E) All of the above

25) Which of the following is not a property of all linear programming problems?

C) a computer program

26) A feasible solution to a linear programming problem

B) must satisfy all of the problem's constraints simultaneously.

27) Infeasibility in a linear programming problem occurs when

E) there is no solution that satisfies all the constraints given.

28) In a maximization problem, when one or more of the solution variables and the profit can be made infinitely large without violating any constraints, the linear program has

B) an unbounded solution.

29) Which of the following is not a part of every linear programming problem formulation?

D) a redundant constraint

30) When appropriate, the optimal solution to a maximization linear programming problem can be found by graphing the feasible region and

A) finding the profit at every corner point of the feasible region to see which one gives the highest value.

31) The mathematical theory behind linear programming states that an optimal solution to any problem will lie at a(n) \_\_\_\_\_\_\_\_ of the feasible region.

C) corner point or extreme point

32) Which of the following is not a property of linear programs?

B) at least two separate feasible regions

33) The corner point solution method

C) requires that the profit from all corners of the feasible region be compared.

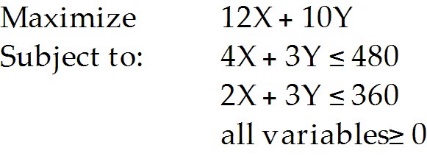
34) When a constraint line bounding a feasible region has the same slope as an isoprofit line,

A) there may be more than one optimum solution.

35) The simultaneous equation method is

C) an algebraic means for solving the intersection of two or more constraint equations.

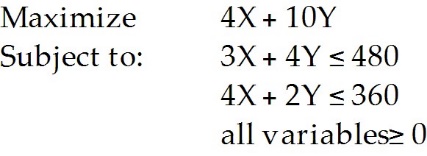
36) Consider the following linear programming problem:



The maximum possible value for the objective function is

C) 1520.

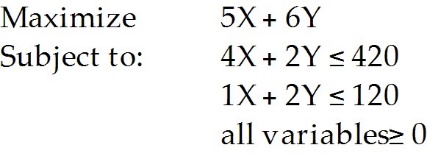
37) Consider the following linear programming problem:



The feasible corner points are (48,84), (0,120), (0,0), (90,0). What is the maximum possible value for the objective function?

B) 1200

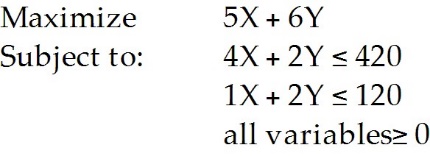
38) Consider the following linear programming problem:



Which of the following points (X,Y) is not a feasible corner point?

C) (120,0)

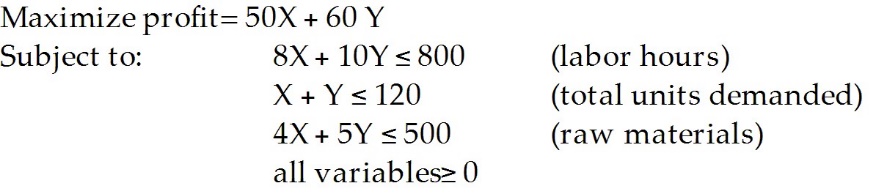
39) Consider the following linear programming problem:



Which of the following points (X,Y) is not feasible?

A) (50,40)

40) Two models of a product — Regular (X) and Deluxe (Y) — are produced by a company. A linear programming model is used to determine the production schedule. The formulation is as follows:

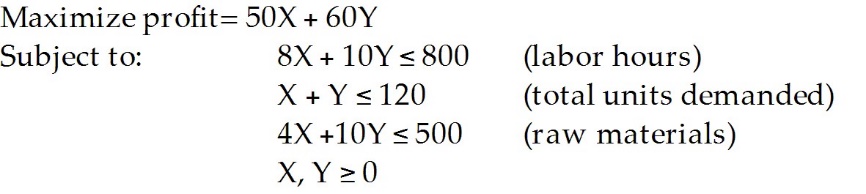


The optimal solution is X = 100, Y = 0.

How many units of the regular model would be produced based on this solution?

B) 100

41) Two models of a product — Regular (X) and Deluxe (Y) — are produced by a company. A linear programming model is used to determine the production schedule. The formulation is as follows:

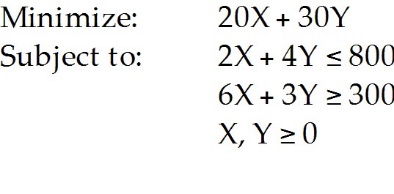


The optimal solution is X=100, Y=0.

Which of these constraints is redundant?

B) the second constraint

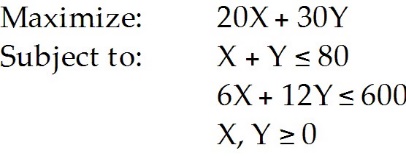
42) Consider the following linear programming problem:



What is the optimum solution to this problem (X,Y)?

B) (50,0)

43) Consider the following linear programming problem:



This is a special case of a linear programming problem in which

E) None of the above

**Stat test bank chapter 8:**

1) In a production scheduling problem, the inventory at the end of this month is set equal to the inventory at the end of last month + last month's production − sales this month.

Answer: FALSE

2) Blending problems arise when one must decide which of two or more ingredients is to be chosen to produce a product.

Answer: FALSE

3) Determining the mixture of ingredients for a most economical feed or diet combination would be described as a production mix type of linear program.

Answer: FALSE

4) A media selection LP application describes a method in which media producers select customers.

Answer: FALSE

5) The constraints in a transportation problem deal with requirements at each origin and capacities at each destination.

Answer: FALSE

6) An ingredient or blending problem is a special case of the more general problem known as diet and feed mix problems.

Answer: FALSE

7) In general, linear programming is unable to solve complex labor planning as the objective function is usually not definable.

Answer: FALSE

8) Linear programming variable names such as X11, X12, X13, could possibly be used to represent production of a product (X1j ) over several months.

Answer: TRUE

9) Since the production mix linear program applications are a special situation, the number of decision variables is limited to two.

Answer: FALSE

10) In formulating the media selection linear programming model, we are unable to take into account the effectiveness of a particular presentation (e.g., the fact that only 5 percent of the people exposed to a radio ad will respond as desired).

Answer: FALSE

11) A marketing research linear programming model can help a researcher structure the least expensive, statistically meaningful sample.

Answer: TRUE

12) Another name for the transportation problem is the logistics problem.

Answer: FALSE

13) Transporting goods from several origins to several destinations efficiently is called the transportation problem.

Answer: TRUE

14) The linear programming approach to media selection problems is typically to either maximize the number of ads placed per week or to minimize advertising costs.

Answer: FALSE

15) The linear programming model of the production mix problem only includes constraints of the less than or equal form.

Answer: FALSE

16) The linear programming model of the production scheduling process can include the impact of hiring and layoffs, regular and overtime pay rates, and the desire to have a constant and stable production schedule over a several-month period.

Answer: TRUE

17) The linear programming model of the production scheduling process is usually used when we have to schedule the production of a single product, requiring a mix of resources, over time.

Answer: FALSE

18) The linear programming model of the production scheduling process is usually used when we have to schedule the production of multiple products, each of which requires a set of resources not required by the other products, over time.

Answer: FALSE

19) Production scheduling is amenable to solution by LP because it is a problem that must be solved on a regular basis.

Answer: TRUE

20) If a linear programming problem has alternate solutions, the order in which you enter the constraints may affect the particular solution found.

Answer: TRUE

25) Using linear programming to maximize audience exposure in an advertising campaign is an example of the type of linear programming application known as

A) media selection.

26) The selection of specific media from among a wide variety of alternatives is the type of LP problem known as

E) None of the above

27) The following does not represent a factor a manager might typically consider when employing linear programming for a production scheduling:

D) risk assessment.

**Table 8-1**

A small furniture manufacturer produces tables and chairs. Each product must go through three stages of the manufacturing process: assembly, finishing, and inspection. Each table requires 3 hours of assembly, 2 hours of finishing, and 1 hour of inspection. Each chair requires 2 hours of assembly, 2 hours of finishing, and 1 hour of inspection. The profit per table is $120 while the profit per chair is $80. Currently, each week there are 200 hours of assembly time available, 180 hours of finishing time, and 40 hours of inspection time. Linear programming is to be used to develop a production schedule. Define the variables as follows:



28) According to Table 8-1, which describes a production problem, what would the objective function be?

B) Maximize 120T + 80C

29) According to Table 8-1, which describes a production problem, which of the following would be a necessary constraint in the problem?

A) T + C ≤ 40

30) According to Table 8-1, which describes a production problem, which of the following would be a necessary constraint in the problem?

B) 3T + 2C ≤ 200

31) According to Table 8-1, which describes a production problem, suppose it is decided that there must be 4 chairs produced for every table. How would this constraint be written?

C) 4T = C

32) According to Table 8-1, which describes a production problem, suppose it is decided that the number of hours used in the assembly process must be at least 80 percent of the time available. How would this constraint be written?

A) 3T + 2C ≥ 160

33) According to Table 8-1, which describes a production problem, suppose it is decided that the number of hours used in the assembly process must be at least 90 percent of the number of hours used in the finishing department. How would this constraint be written?

B) 3T + 2C ≥ 0.9(2T + 2C)

34) Media selection problems are typically approached with LP by either

D) maximizing audience exposure or minimizing advertising costs.

35) Which of the following is considered a decision variable in the media selection problem of maximizing audience exposure?

C) the number of ads of each type

36) Which of the following is considered a decision variable in the media selection problem of minimizing interview costs in surveying?

A) the number of people to survey in each market segment

37) In production scheduling LP problems, inventory at the end of this month is set equal to \_\_\_\_\_\_\_\_.

A) inventory at the end of last month + this month's production − this month's sales

38) Which of the following is considered a decision variable in the production mix problem of maximizing profit?

D) the amount of each product to produce

**Table 8-2**

A small furniture manufacturer produces tables and chairs. Each product must go through three stages of the manufacturing process: assembly, finishing, and inspection. Each table requires 4 hours of assembly, 3 hours of finishing, and 1 hour of inspection. Each chair requires 3 hours of assembly, 2 hours of finishing, and 2 hours of inspection. The selling price per table is $140 while the selling price per chair is $90. Currently, each week there are 220 hours of assembly time available, 160 hours of finishing time, and 45 hours of inspection time. Assume that one hour of assembly time costs $5.00; one hour of finishing time costs $6.00; one hour of inspection time costs $4.50; and that whatever labor hours are not required for the table and chairs can be applied to another product. Linear programming is to be used to develop a production schedule. Define the variables as follows:



39) According to Table 8-2, which describes a production problem, what would the objective function be?

D) Maximize 97.5T + 54C

40) According to Table 8-2, which describes a production problem, suppose it was decided that all the labor hour costs have to be covered through the sale of the tables and chairs, regardless of whether or not all the labor hours are actually used. How would the objective function be written?

A) Maximize 140T + 90C

41) According to Table 8-2, which describes a production problem, suppose you realize that you can *trade off* assembly hours for finishing hours, but that the total number of finishing hours, including the trade-off hours, cannot exceed 240 hours. How would this constraint be written?

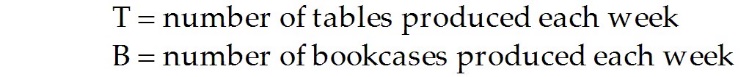
E) None of the above

42) Suppose that the problem described in Table 8-2 is modified to specify that one-third of the tables produced must have 6 chairs, one-third must have 4 chairs, and one-third must have 2 chairs. How would this constraint be written?

A) C = 4T

**Table 8-3**

Each coffee table produced by Timothy Kent Designers nets the firm a profit of $9. Each bookcase yields a $12 profit. Kent’s firm is small and its resources limited. During any given production period (of 1 week), 10 gallons of varnish and 12 lengths of high quality redwood are available. Each coffee table requires approximately 1 gallon of varnish and 1 length of redwood. Each bookcase takes 1 gallon of varnish and 2 lengths of wood.



43) Referring to Table 8-3, if we were to frame this as a linear programming problem, the objective function would be:

B) Maximize 9T + 12B.

44) Referring to Table 8-3, which of the following constraints would be used?

B) 1T + 1B ≤ 10

45) Referring to Table 8-3, which of the following constraints would be used?

E) None of the above

**Stat test bank chapter 9:**

1) Transportation and assignment problems are really linear programming techniques called network flow problems.

Answer: TRUE

2) Transportation models may be used when a firm is trying to decide where to locate a new facility.

Answer: TRUE

3) A typical transportation problem may ask the question, "How many of X should be shipped to point E from source A?"

Answer: TRUE

4) The objective of a transportation problem solution is to schedule shipments from sources to destinations while minimizing total transportation and production costs.

Answer: TRUE

5) In a transportation problem, each destination must be supplied by one and only one source.

Answer: FALSE

6) In a transportation problem, a single source may supply something to all destinations.

Answer: TRUE

7) In finding the maximum quantity that can be shipped on the least costly route using the stepping-stone method, one examines the closed path of plus and minus signs drawn and selects the smallest number found in those squares containing minus signs.

Answer: TRUE

8) In using the stepping-stone method, the path can turn at any box or cell that is unoccupied.

Answer: FALSE

9) Using the stepping-stone method to solve a maximization problem, we would choose the route with the largest positive improvement index.

Answer: TRUE

10) One of the advantages of the stepping-stone method is that if, at a particular iteration, we accidentally choose a route that is not the best, the only penalty is to perform additional iterations.

Answer: TRUE

11) A "balanced problem" exists in a transportation model when the optimal solution has the same amount being shipped over all paths that have any positive shipment.

Answer: FALSE

12) It is possible to find an optimal solution to a transportation problem that is degenerate.

Answer: TRUE

13) A solution to the transportation problem can become degenerate at any iteration.

Answer: TRUE

14) The transportation algorithm can be used to solve both minimization problems and maximization problems.

Answer: TRUE

15) Assignment problems involve determining the most efficient assignment of people to projects, salesmen to territories, contracts to bidders, and so on.

Answer: TRUE

16) The objective of an assignment problem solution most often is to minimize the total costs or time of performing the assigned tasks.

Answer: TRUE

17) In the assignment problem, the costs for a dummy row will be equal to the lowest cost of the column for each respective cell in that row.

Answer: FALSE

18) The Hungarian method is designed to solve transportation problems efficiently.

Answer: FALSE

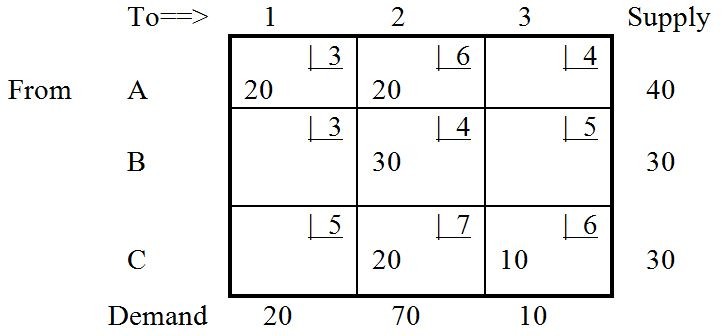
19) Maximization assignment problems can easily be converted to minimization problems by subtracting each rating from the largest rating in the table.

Answer: TRUE

20) In a transportation problem, a dummy source is given a zero cost, while in an assignment problem, a dummy source is given a very high cost.

Answer: FALSE

**Table 9-1**



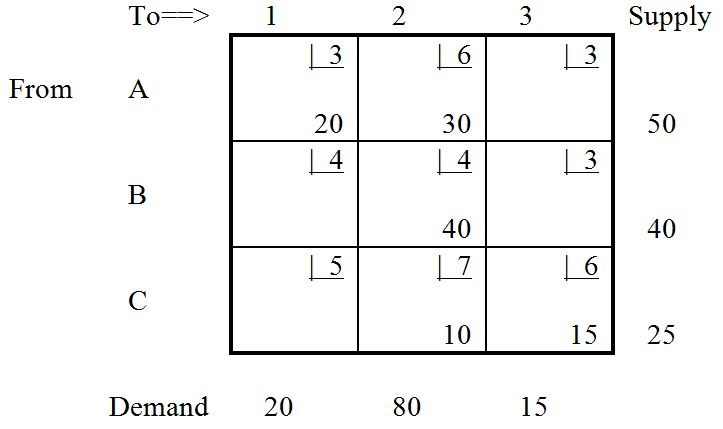
21) What is the total cost represented by the solution shown in Table 9-1?

D) 500

22) What is the value of the improvement index for cell B1 shown in Table 9-1?

C) +2

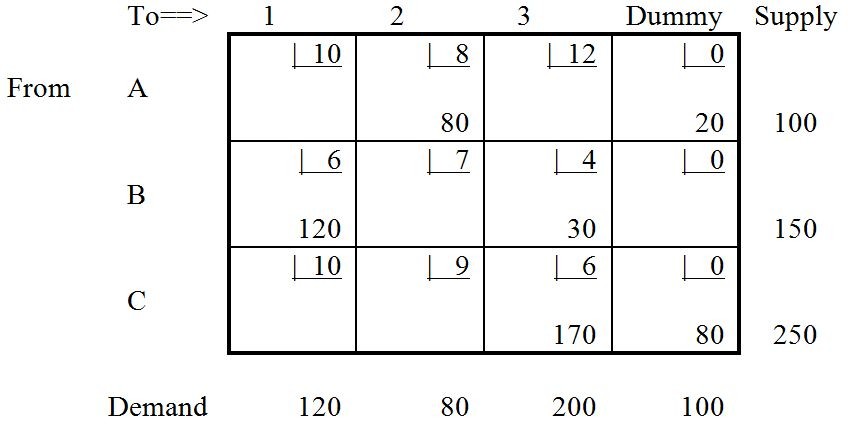
**Table 9-2**



23) In Table 9-2, cell A3 should be selected to be filled in the next solution. If this was selected as the cell to be filled, and the next solution was found using the appropriate stepping-stone path, how many units would be assigned to this cell?

B) 15

**Table 9-3**



The following improvements are proved for Table 9-3:

|  |  |
| --- | --- |
| **Cell** | **Improvement Index** |
| A1 | +2 |
| A3 | +6 |
| B2 | +1 |
| B-Dummy | +2 |
| C1 | +2 |
| C2 | +1 |

24) The cell improvement indices for Table 9-3 suggest that the optimal solution has been found. Based on this solution, how many units would actually be sent from source C?

B) 170

25) In Table 9-3, suppose shipping cost from source C to point 2 was 8, which below would be true?

A) There would be multiple optimal solutions.

26) Both transportation and assignment problems are members of a category of LP techniques called \_\_\_\_\_\_\_\_.

E) network flow problems

27) Transportation models can be used for which of the following decisions?

A) facility location

28) When using a general LP model for transportation problems, if there are 4 sources and 3 destinations, which of the following statements is true?

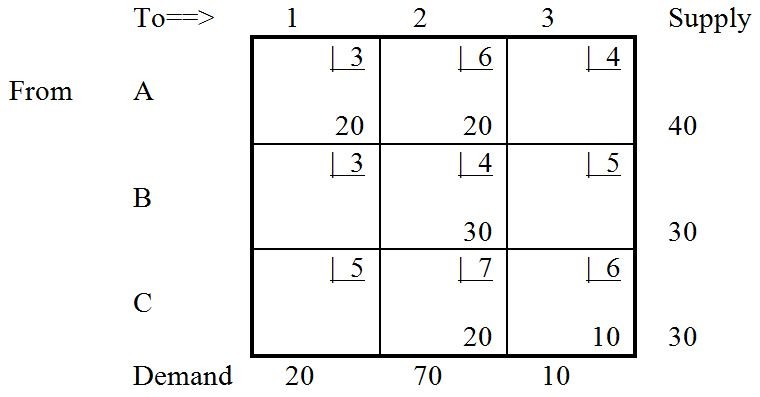
B) There are typically 12 decision variables and 7 constraints.

29) The two most common objectives for the assignment problem are the minimization of \_\_\_\_\_\_\_\_.

C) total costs or total time

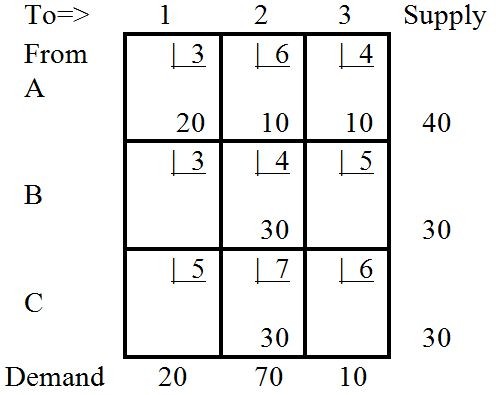
30) Assuming that Table 9-4 represents the results of an iteration of a transportation model,

**Table 9-4**

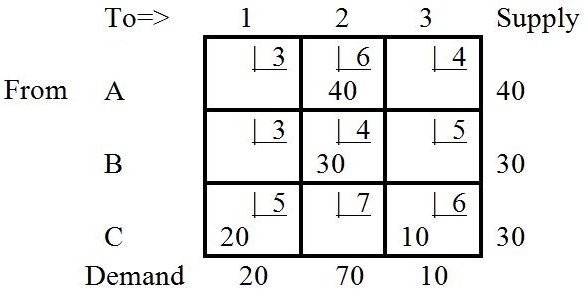


The next tableau will be:

B)



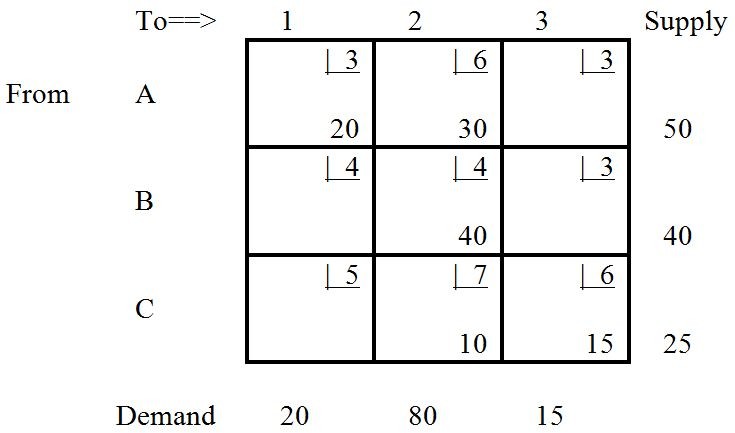
**Table 9-5**



31) Table 9-5 represents a solution that is

B) degenerate.

**Table 9-6**



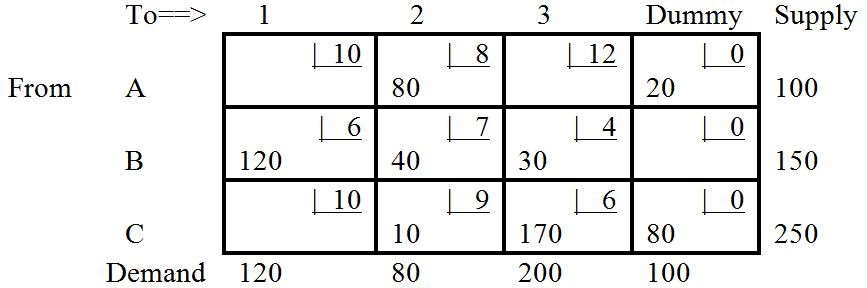
32) In Table 9-6, if cell A3 is filled on the next iteration, what is the improvement in the objective function?

B) 30

33) A transportation problem

E) All of the above

**Table 9-7**



34) Table 9-7 illustrates a(n)

D) infeasible solution.

35) The only restriction we place on the initial solution of a transportation problem is that

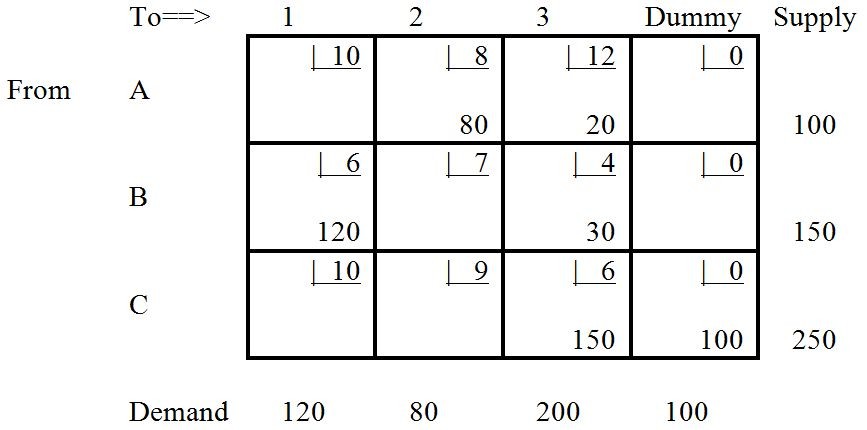
B) all constraints must be satisfied.

36) Which of the following is used to summarize conveniently and concisely all relevant data and to keep track of algorithm computations?

D) transportation table

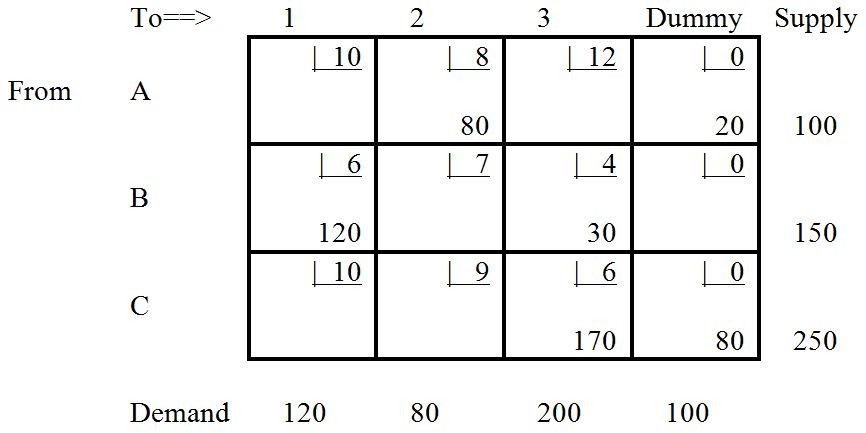
37) In Table 9-8, which cell should be filled on the next iteration?

**Table 9-8**



B) ADummy

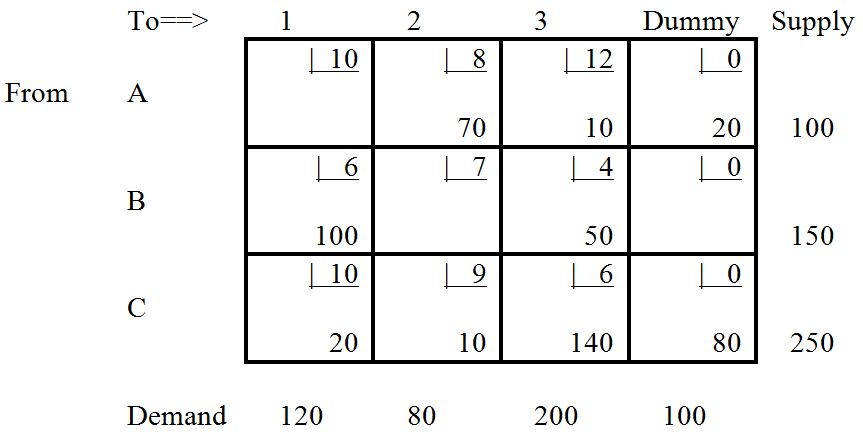
**Table 9-9**



38) The solution presented in Table 9-9 is

D) optimal.

**Table 9-10**



39) What is wrong with Table 9-10?

E) There are too many filled cells.

40) Which of the following statements concerning the transshipment problem are false?

E) Any units shipped from one origin point must all go to the same destination point.

**Stat test bank chapter 12:**

1) PERT and CPM are quantitative analysis tools designed to schedule and control large projects.

Answer: TRUE

2) PERT is a deterministic analysis tool allowing for precise times of activities within a project.

Answer: FALSE

3) PERT had its beginnings in a military department of the United States.

Answer: TRUE

4) CPM is a probabilistic analysis of managing a project.

Answer: FALSE

5) The first step in planning and scheduling a project is to develop the work breakdown structure.

Answer: TRUE

6) A PERT/CPM network is a graphical display of a project that connects activities.

Answer: TRUE

7) The optimistic time is the greatest amount of time that could be required to complete an activity.

Answer: FALSE

8) PERT is a network technique similar to CPM, but PERT allows for project crashing, whereas CPM does not.

Answer: FALSE

9) In PERT, the most likely completion time of an activity is used to represent that activity's time within a project.

Answer: FALSE

10) The expected completion time and variance of an activity is approximated by the normal distribution in a PERT analysis.

Answer: FALSE

11) PERT was developed for a project for which activity or task times were uncertain.

Answer: TRUE

12) CPM was developed for use in managing projects about which we have good information about activity or task completion times.

Answer: TRUE

13) With PERT, we are able to calculate the probability of finishing the project within a specified time.

Answer: TRUE

14) With CPM, we are able to calculate the probability of finishing the project within a specified time.

Answer: FALSE

15) Both PERT and CPM networks show activities and activity sequences.

Answer: TRUE

16) The identification of the project activities and their time, cost, resource requirements, predecessors, and person(s) responsible is called PERT planning.

Answer: FALSE

17) Before drawing a PERT or CPM network, we must identify all activities and their predecessors.

Answer: TRUE

18) The three time estimates employed in PERT are optimistic time, average time, and pessimistic time.

Answer: FALSE

19) Given the variability of the activity completion times, the original critical path we identify in our PERT analysis may not always be the actual critical path as the project takes place.

Answer: TRUE

20) In PERT, the earliest start time for an activity is equal to the latest of the earliest finish times of all of its immediate predecessors.

Answer: TRUE

35) The critical path of a network is the

D) longest time path through the network.

36) In a PERT network, the earliest (activity) start time is the

C) earliest time that an activity can start without violation of precedence requirements.

37) Slack time in a network is the

E) amount of time that an activity can be delayed without delaying the entire project.

38) The first step in planning and scheduling a project is to develop the \_\_\_\_\_\_\_\_.

D) work breakdown structure

39) Which of the following is not a concept associated with CPM?

B) probability

40) PERT

C) is a network technique that uses three time estimates for each activity in a project.

41) CPM

C) is a deterministic network technique that allows for project crashing.

42) Managers use the network analysis of PERT and CPM to help them

D) All of the above

43) The expected time in PERT is

A) a weighted average of the most optimistic time, most pessimistic time, and four times the most likely time.

44) Given an activity's optimistic, most likely, and pessimistic time estimates of 4, 6, and 14 days respectively, compute the PERT expected activity time for this activity.

C) 7

45) Given an activity's optimistic, most likely, and pessimistic time estimates of 2, 5, and 14 days respectively, compute the PERT expected activity time for this activity.

A) 6

46) Given an activity's optimistic, most likely, and pessimistic time estimates of 4, 14, and 18 days respectively, compute the PERT expected activity time for this activity.

D) 13

47) Given an activity's optimistic, most likely, and pessimistic time estimates of 2, 10, and 20 days respectively, compute the PERT variance for this activity.

C) 9

48) Given an activity's optimistic, most likely, and pessimistic time estimates of 4, 12, and 18 days respectively, compute the PERT variance for this activity.

B) 5.44

49) Given an activity's optimistic, most likely, and pessimistic time estimates of 3, 5, and 15 days, respectively, compute the PERT standard deviation for this activity.

A) 2

50) Given the following small project, the critical path is \_\_\_\_\_\_\_\_ days.

|  |  |  |
| --- | --- | --- |
| Activity | Immediate  Predecessor | Time  (days) |
| A | - | 10 |
| B | - | 4 |
| C | A, B | 6 |

C) 16

51) Given the following small project, the critical path is \_\_\_\_\_\_\_\_ days.

|  |  |  |
| --- | --- | --- |
| Activity | Immediate  Predecessor | Time  (days) |
| A | - | 8 |
| B | A | 4 |
| C | - | 10 |

C) 12

**Table 12-1**

The following represents a project with know activity times. All times are in weeks.

|  |  |  |
| --- | --- | --- |
| Activity | Immediate  Predecessor | Time |
| A | - | 4 |
| B | - | 3 |
| C | A | 2 |
| D | B | 7 |
| E | C, D | 4 |
| F | B | 5 |

52) Using the data in Table 12-1, what is the minimum possible time required for completing the project?

B) 14

53) Using the data in Table 12-1, what is the latest possible time that C may be started without delaying completion of the project?

C) 8

54) According to Table 12-1, compute the slack time for activity D.

A) 0

55) Using the data in Table 12-1, compute the latest finish time for activity E.

C) 14

**Stat test bank chapter 13:**

1) A goal of many waiting line problems is to help a firm find the ideal level of services that minimize the cost of waiting and the cost of providing the service.

Answer: TRUE

2) One difficulty in waiting line analysis is that it is sometimes difficult to place a value on customer waiting time.

Answer: TRUE

3) The goal of most waiting line problems is to identify the service level that minimizes service cost.

Answer: FALSE

4) Two characteristics of arrivals are the line length and queue discipline.

Answer: FALSE

5) Limited calling populations are assumed for most queuing models.

Answer: FALSE

6) An "infinite calling population" occurs when the likelihood of a new arrival depends upon the number of past arrivals.

Answer: FALSE

7) On a practical note — if we were to study the waiting lines in a hair salon that had only five chairs for patrons waiting, we should use an infinite queue waiting line model.

Answer: FALSE

8) If we are studying the arrival of automobiles at a highway toll station, we can assume an infinite calling population.

Answer: TRUE

9) When looking at the arrivals at the ticket counter of a movie theater, we can assume an unlimited queue.

Answer: TRUE

10) Arrivals are random when they are dependent on one another and can be predicted.

Answer: FALSE

11) On a practical note — if we are using waiting line analysis to study customers calling a telephone number for service, balking is probably not an issue.

Answer: FALSE

12) On a practical note — if we are using waiting line analysis to study cars passing through a single tollbooth, reneging is probably not an issue.

Answer: TRUE

13) On a practical note — we should probably view the checkout counters in a grocery store as a set of single channel systems.

Answer: TRUE

14) A bank with a single queue to move customers to several tellers is an example of a single-channel system.

Answer: FALSE

15) Service times often follow a Poisson distribution.

Answer: FALSE

16) An M/M/2 model has Poisson arrivals exponential service times and two channels.

Answer: TRUE

17) In a single-channel, single-phase system, reducing the service time only reduces the total amount of time spent in the system, not the time spent in the queue.

Answer: FALSE

18) The wait time for a single-channel system is more than twice that for a two-channel system using two servers working at the same rate as the single server.

Answer: TRUE

19) The study of waiting lines is called queuing theory.

Answer: TRUE

20) The three basic components of a queuing process are arrivals, service facilities, and the actual waiting line.

Answer: TRUE

36) Queuing theory had its beginning in the research work of \_\_\_\_\_\_\_\_.

B) A.K. Erlang

37) Assume that we are using a waiting line model to analyze the number of service technicians required to maintain machines in a factory. Our goal should be to

E) minimize the total cost (cost of maintenance plus cost of downtime).

38) In queuing analysis, total expected cost is the sum of expected \_\_\_\_\_\_\_\_ plus expected \_\_\_\_\_\_\_\_.

E) service costs, waiting costs

39) In queuing theory, the calling population is another name for \_\_\_\_\_\_\_\_.

C) the arrivals

40) Which of the following is not a valid queuing model based on the Kendall notation?

D) M/M/0

41) Which of the following is not true about arrivals?

E) The exponential distribution is often used to represent the arrival pattern.

42) An arrival in a queue that reneges is one who

A) after joining the queue, becomes impatient and leaves.

43) The customer who arrives at a bank, sees a long line, and leaves to return another time is

A) balking.

44) The three major characteristics of the input source that generates arrivals or customers for the service system are \_\_\_\_\_\_\_\_.

B) size, pattern, and behavior

45) The term queue "discipline" describes the

D) sequence in which members of the queue are serviced.

46) A vendor selling newspapers on a street corner is an example of a

B) single-channel, single-phase system.

47) Lines at banks where customers wait for a teller window are usually representative of a

D) multichannel, single-phase system.

48) Which of the following distributions is most often used to estimate the arrival pattern?

C) Poisson

49) A single automatic car wash with one bay and a cycle time of 2.5 minutes is what type of model?

D) M/D/1

50) A single automatic car wash with one bay and a service time that is normally distributed is what type of model?

E) M/G/1

51) Which of the following is not an assumption in common queuing mathematical models?

D) Service rates follow the normal distribution.

52) The "utilization factor" is defined as the

E) None of the above

53) A suburban specialty restaurant has developed a single drive-thru window. Customers order, pay, and pick up their food at the same window. Arrivals follow a Poisson distribution, while service times follow an exponential distribution. What type of queuing model is exhibited in this problem?

D) M/D/1

54) A suburban specialty restaurant has developed a single drive-thru window. Customers order, pay, and pick up their food at the same window. Arrivals follow a Poisson distribution, while service times follow an exponential distribution. If the average number of arrivals is 6 per hour and the service rate is 2 every 15 minutes, what is the average number of customers in the system?

D) 3.00

55) A suburban specialty restaurant has developed a single drive-thru window. Customers order, pay, and pick up their food at the same window. Arrivals follow a Poisson distribution while service times follow an exponential distribution. If the average number of arrivals is 6 per hour and the service rate is 2 every 15 minutes, what is the average number of customers waiting in line behind the person being served?

C) 2.25

56) A suburban specialty restaurant has developed a single drive-thru window. Customers order, pay, and pick up their food at the same window. Arrivals follow a Poisson distribution while service times follow an exponential distribution. If the average number of arrivals is 6 per hour and the service rate is 2 every 15 minutes, what proportion of the time is the server busy?

C) 0.75

**Stat test bank chapter 14:**

1) Simulation of a business or process is generally performed by building a mathematical model to represent the process or system.

Answer: TRUE

2) Simulation models are designed to generate optimal solutions, which can then be applied to real-world situations.

Answer: FALSE

3) A major advantage of using simulation techniques is to be able to study the interactive effect of individual components/variables.

Answer: TRUE

4) Despite the power of simulation, less than 20% of the largest U.S. corporations use simulation in corporate planning.

Answer: FALSE

5) One of the major advantages of simulation is "time compression," i.e., the ability to study in a relatively short period, activities that would, in reality, take place over a period of days, months, or even years.

Answer: TRUE

6) To "simulate" is to try to duplicate the features, appearance, and characteristics of a real system.

Answer: TRUE

7) While it is powerful, simulation is not considered to be a flexible quantitative analysis tool.

Answer: FALSE

8) Simulation can use any probability distribution that the user defines; it does not require standard distributions.

Answer: TRUE

9) One disadvantage of simulation is that it does not allow for "what-if?" types of questions.

Answer: FALSE

10) Simulation models may contain both deterministic and probabilistic variables.

Answer: TRUE

11) Monte Carlo simulation was developed as a quantitative technique by the great mathematician John von Neumann during World War I.

Answer: FALSE

12) Simulation models are limited to using standard probability distributions such as Poisson, exponential, normal, etc.

Answer: FALSE

13) The Monte Carlo simulation is used with variables that are probabilistic.

Answer: TRUE

14) When using a random number generator, one should never start in the middle of the table of random numbers.

Answer: FALSE

15) If we are using a Monte Carlo simulation model, we should expect the model to produce the same results for each set of random numbers used.

Answer: FALSE

16) The four disadvantages of simulation are cost, its trial-and-error nature, time compression, and uniqueness.

Answer: FALSE

17) The wider the variation among results produced by using different sets of random numbers, the longer we need to run the simulation to obtain reliable results.

Answer: TRUE

18) Simulation is very flexible. Thus, its solutions and inferences are usually transferable to other problems.

Answer: FALSE

19) Simulation models are useful for economic order quantity problems with probabilistic demand and lead time.

Answer: TRUE

20) A flow diagram is helpful in the logical coding procedures for programming a simulation process.

Answer: TRUE

29) The following is not an advantage of simulation:

B) Each simulation model is unique.

30) Simulation can be effectively used in many

E) All of the above

31) Monte Carlo simulation was developed by \_\_\_\_\_\_\_\_.

A) John von Neumann

32) In assigning random numbers in a Monte Carlo simulation,

A) it is important to develop a cumulative probability distribution.

**Table 14-1**

A new young mother has opened a cloth diaper service. She is interested in simulating the number of diapers required for a one-year- old. She hopes to use this data to show the cost effectiveness of cloth diapers. The table below shows the number of diapers demanded daily and the probabilities associated with each level of demand.

|  |  |  |
| --- | --- | --- |
| Daily Demand | Probability | Interval of  Random Numbers |
| 5 | 0.30 | 01-30 |
| 6 | 0.50 | 31-80 |
| 7 | 0.05 | 81-85 |
| 8 | 0.15 | 86-00 |

33) According to Table 14-1, if the random number 40 were generated for a particular day, what would the simulated demand be for that day?

B) 6

34) According to Table 14-1, if the random number 96 were generated for a particular day, what would the simulated demand be for that day?

D) 8

35) According to Table 14-1, what is the cumulative probability that demand is less than or equal to 7?

A) 0.85

**Table 14-2**

A pharmacy is considering hiring another pharmacist to better serve customers. To help analyze this situation, records are kept to determine how many customers will arrive in any 10-minute interval. Based on 100 ten-minute intervals, the following probability distribution has been developed and random numbers assigned to each event.

|  |  |  |
| --- | --- | --- |
| Number of Arrivals | Probability | Interval of  Random Numbers |
| 6 | 0.2 | 01-20 |
| 7 | 0.3 | 21-50 |
| 8 | 0.3 | 51-80 |
| 9 | 0.1 | 81-90 |
| 10 | 0.1 | 91-00 |

36) According to Table 14-2, the number of arrivals in any 10-minute period is between 6 and 10, inclusive. Suppose the next three random numbers were 18, 89, and 67, and these were used to simulate arrivals in the next three 10-minute intervals. How many customers would have arrived during this 30-minute time period?

B) 23

37) According to Table 14-2, the number of arrivals in any 10-minute period is between 6 and 10, inclusive. Suppose the next three random numbers were 20, 50, and 79, and these were used to simulate arrivals in the next three 10-minute intervals. How many customers would have arrived during this 30-minute time period?

D) 21

38) According to Table 14-2, the number of arrivals in any 10-minute period is between 6 and 10 inclusive. Suppose the next 3 random numbers were 02, 81, and 18. These numbers are used to simulate arrivals into the pharmacy. What would the average number of arrivals per 10-minute period be based on this set of occurrences?

B) 7

**Table 14-3**

A pawn shop in Arlington, Texas, has a drive-through window to better serve customers. The following tables provide information about the time between arrivals and the service times required at the window on a particularly busy day of the week. All times are in minutes.

|  |  |  |
| --- | --- | --- |
| Time Between Arrivals | Probability | Interval of  Random Numbers |
| 1 | 0.1 | 01-10 |
| 2 | 0.3 | 11-40 |
| 3 | 0.4 | 41-80 |
| 4 | 0.2 | 81-00 |
|  |  |  |
| Service Time | Probability | Interval of  Random Numbers |
| 1 | 0.2 | 01-20 |
| 2 | 0.4 | 21-60 |
| 3 | 0.3 | 61-90 |
| 4 | 0.1 | 91-00 |

The first random number generated for arrivals is used to tell when the first customer arrives after opening.

39) According to Table 14-3, the time between successive arrivals is 1, 2, 3, or 4 minutes. If the store opens at 8:00 a.m., and random numbers are used to generate arrivals, what time would the first customer arrive if the first random number were 02?

A) 8:01

40) According to Table 14-3, the time between successive arrivals is 1, 2, 3, or 4 minutes. The store opens at 8:00 a.m., and random numbers are used to generate arrivals and service times. The first random number to generate an arrival is 39, while the first service time is generated by the random number 94. What time would the first customer finish transacting business?

D) 8:06

41) According to Table 14-3, the time between successive arrivals is 1, 2, 3, or 4 minutes. The store opens at 8:00 a.m., and random numbers are used to generate arrivals and service times. The first 3 random numbers to generate arrivals are 09, 89, and 26. What time does the third customer arrive?

A) 8:07

42) According to Table 14-3, the time between successive arrivals is 1, 2, 3, or 4 minutes. The store opens at 8:00 a.m., and random numbers are used to generate arrivals and service times. The first two random numbers for arrivals are 95 and 08. The first two random numbers for service times are 92 and 18. At what time does the second customer finish transacting business?

C) 8:09

**Table 14-4**

|  |  |  |
| --- | --- | --- |
| Variable Value | Probability | Cumulative Probability |
| 0 | 0.08 | 0.08 |
| 1 | 0.23 | 0.31 |
| 2 | 0.32 | 0.63 |
| 3 | 0.28 | 0.91 |
| 4 | 0.09 | 1.00 |

|  |  |
| --- | --- |
| Number of Runs | 200 |
| Average Value | 2.10 |

43) According to Table 14-4, which presents a summary of the Monte Carlo output from a simulation of 200 runs, there are 5 possible values for the variable of concern. If this variable represents the number of machine breakdowns during a day, what is the probability that the number of breakdowns is 2 or fewer?

D) 0.63

44) According to Table 14-4, which presents a summary of the Monte Carlo output from a simulation of 200 runs, there are 5 possible values for the variable of concern. If this variable represents the number of machine breakdowns during a day, what is the probability that the number of breakdowns is more than 4?

A) 0

45) According to Table 14-4, which presents a summary of the Monte Carlo output from a simulation of 200 runs, there are 5 possible values for the variable of concern. If random numbers between 01 and 100 are used to generate values, then a random draw of 72 would produce a variable value of \_\_\_\_\_\_\_\_.

D) 3

46) Which of the following represents the primary reason simulation cannot be used for the classic EOQ model?

D) EOQ models are deterministic

47) Which of the following scenarios would require simulation for a queuing model?

E) None of the above

48) Simulation models can be broken down into which of the following three categories?

C) Monte Carlo, operational gaming, systems simulation

49) Which of the following is not considered one of the 5 steps of Monte Carlo Simulation?

D) establishing an objective function