

Introduction to Management Science, 10e (Taylor)
Chapter 1 Management Science

1) Management science involves the philosophy of approaching a problem in a subjective manner.

Answer: FALSE

Diff: 1 Page Ref: 2

Main Heading: The Management Science Approach to Problem Solving

Key words: scientific approach

2) Management science techniques can be applied only to business and military organizations.

Answer: FALSE

Diff: 1 Page Ref: 2

Main Heading: The Management Science Approach to Problem Solving

Key words: scientific approach, problem solving

3) Once management scientist makes his or her decision and recommendation to management, then typically, his or her involvement with the problem is finished.

Answer: FALSE

Diff: 2 Page Ref: 6

Main Heading: The Management Science Approach to Problem Solving

Key words: management science, management scientist

4) A variable is a value that is usually a coefficient of a parameter in an equation.

Answer: FALSE

Diff: 1 Page Ref: 3

Main Heading: The Management Science Approach to Problem Solving

Key words: variable

5) Parameters are known, constant values that are usually coefficients of variables in equations.

Answer: TRUE

Diff: 1 Page Ref: 4

Main Heading: The Management Science Approach to Problem Solving

Key words: parameter

6) Data are pieces of information from the problem environment.

Answer: TRUE

Diff: 1 Page Ref: 4

Main Heading: The Management Science Approach to Problem Solving

Key words: data

7) A model is a mathematical representation of a problem situation including variables, parameters, and equations.

Answer: TRUE

Diff: 1 Page Ref: 3

Main Heading: The Management Science Approach to Problem Solving

Key words: model, management science techniques

8) A management science technique usually applies to a specific model type.

Answer: TRUE

Diff: 1 Page Ref: 3

Main Heading: The Management Science Approach to Problem Solving

Key words: models, management science techniques

9) The first step of the management science process is to define the problem.

Answer: FALSE

Diff: 2 Page Ref: 2

Main Heading: The Management Science Approach to Problem Solving

Key words: management science process

10) Management science modeling techniques provide results that are known with certainty.

Answer: FALSE

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Main Heading: The Management Science Approach to Problem Solving

Key words: management science modeling techniques, certainty

11) The term sensitivity analysis refers to testing how a problem solution reacts to changes in one or more of the model parameters.

Answer: TRUE

Diff: 1 Page Ref: 10

Main Heading: Model Building: Break-Even Analysis

Key words: sensitivity analysis, parameter changes

12) Fixed costs depend on the number of items produced.

Answer: FALSE

Diff: 1 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: fixed cost, break-even analysis

13) Variable costs depend on the number of items produced.

Answer: TRUE

Diff: 1 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: variable cost, break-even analysis

14) Fixed cost is the difference between total cost and total variable cost.

Answer: TRUE

Diff: 1 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: total cost, break-even analysis

15) The break-even point is the volume that equates total revenue with total cost.

Answer: TRUE

Diff: 1 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

16) In general, an increase in price increases the break even point if all costs are held constant.

Answer: FALSE

Diff: 1 Page Ref: 10

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

17) If variable costs increase, but price and fixed costs are held constant, the break even point will decrease.

Answer: FALSE

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Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

18) Managers utilize spreadsheets to conduct their own analyses in management science studies.

Answer: TRUE

Diff: 2 Page Ref: 12

Main Heading: Computer Solution

Key words: spreadsheets

19) Management science techniques focus primarily on observation, model construction and implementation to find an appropriate solution to a problem.

Answer: FALSE

Diff: 2 Page Ref: 2

Main Heading: Management Science Modeling Techniques

Key words: mgt sci modeling techniques, steps of the scientific method

20) Management science modeling techniques focus on model construction and problem solution.

Answer: TRUE

Diff: 2 Page Ref: 2

Main Heading: Management Science Modeling Techniques

Key words: mgt science model techniques, model constr, prob solution

21) Decision Support Systems (DSS) use computers to help decision makers address complex problems.

Answer: TRUE

Diff: 1 Page Ref: 20

Main Heading: Management Science Models in Decision Support Systems

Key words: decision making, management science

22) Enterprise Resource Planning (ERP) system is a data oriented decision support system that utilizes specific management science solution procedures to solve individual problems such as cost-volume analysis.

Answer: FALSE

Diff: 1 Page Ref: 21

Main Heading: Management Science Models in Decision Support Systems

Key words: decision support systems

23) A _____ is a symbol used to represent an item that can take on any value.

Answer: variable

Diff: 1 Page Ref: 3

Main Heading: The Management Science Approach to Problem Solving

Key words: variable, management science process

24) _____ are known, constant values that are coefficients of variables in equations.

Answer: Parameters

Diff: 1 Page Ref: 4

Main Heading: The Management Science Approach to Problem Solving

Key words: model, parameters

25) _____ are pieces of information from the problem environment.

Answer: Data

Diff: 1 Page Ref: 4

Main Heading: The Management Science Approach to Problem Solving

Key words: data

26) A _____ is a functional relationship including variables, parameters, and equations.

Answer: model

Diff: 1 Page Ref: 4

Main Heading: The Management Science Approach to Problem Solving

Key words: model

27) Management science techniques include _____ techniques, models that are represented as diagrams, presenting a pictorial representation of the system being analyzed.

Answer: Network

Diff: 1 Page Ref: 17

Main Heading: The Management Science Approach to Problem Solving

Key words: management science, networks

28) _____ techniques provide results that contain uncertainty, unlike mathematical programming techniques which are deterministic.

Answer: Probabilistic

Diff: 1 Page Ref: 17

Main Heading: The Management Science Approach to Problem Solving

Key words: management science techniques, probabilistic techniques

29) _____ costs are independent of the volume of goods produced and remain constant.

Answer: Fixed

Diff: 1 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: fixed cost, break-even analysis

30) _____ depend on the number of items produced.

Answer: Variable costs

Diff: 1 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: variable cost, break-even analysis

31) Total revenue minus total cost equals _____ .

Answer: profit

Diff: 1 Page Ref: 8

Main Heading: Model Building: Break-Even Analysis

Key words: profit, break-even analysis

32) The _____ is the volume that equates total revenue with total cost.

Answer: break-even point

Diff: 1 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

33) A _____ represents a limitation to achieving maximum profits due to limited resources.

Answer: constraint

Diff: 1 Page Ref: 4

Main Heading: Management Science Modeling Techniques

Key words: constraint, model development

34) A _____ programming technique refers to a predetermined set of mathematical steps used to solve a problem.

Answer: linear

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Main Heading: Management Science Modeling Techniques

Key words: linear programming formulation

35) A _____ is a computer-based system that helps decision-makers address complex problems that involve different parts of an organization and operations.

Answer: decision support system

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Main Heading: Management Science Models in Decision Support Systems

Key words: decision support systems

36) The relationship $d = 5000 - 25p$ describes what happens to demand (d) as price (p) varies. Price can vary between \$10 and \$50. How many units can be sold when the price is \$10?

Answer: 4750

Diff: 1 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

37) The supplier of cans for Coors Brewery, Valley Metal Container, uses a _____ to determine the weekly production schedule for cans in order to meet brewery demand.

Answer: decision support system

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Main Heading: Management Science Models in Decision Support Systems

Key words: decision support systems

38) A production process requires a fixed cost of \$50,000. The variable cost per unit is \$25 and the revenue per unit is projected to be \$45. Write a mathematical expression for total cost.

Answer: $C(x) = 50000 + 25x$

Diff: 1 Page Ref: 8

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

39) A production process requires a fixed cost of \$50,000. The variable cost per unit is \$25 and the revenue per unit is projected to be \$45. Write a mathematical expression for total revenue.

Answer: $R(x) = 45x$

Diff: 1 Page Ref: 8

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

40) A production process requires a fixed cost of \$50,000. The variable cost per unit is \$25 and the revenue per unit is projected to be \$45. Write a mathematical expression for total profit.

Answer: $P(x) = 45x - (50000 + 25x)$

Diff: 1 Page Ref: 8

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

41) A production process requires a fixed cost of \$50,000. The variable cost per unit is \$25 and the revenue per unit is projected to be \$45. Find the break-even point.

Answer: $X = 2500$

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

42) A production process requires a fixed cost of \$50,000 and the variable cost per unit is \$25. The revenue per unit was projected to be \$45 but a recent marketing study shows that because of an emerging competitor, the revenue will be about 12% lower. How does this affect the break even point?

Answer: The break even point will be higher, at 3424 units, which is a 37% increase

Diff: 3 Page Ref: 10

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

43) Administrators at a university will charge students \$150 to attend a seminar. It costs \$3000 to reserve a room, hire an instructor, and bring in the equipment. Assume it costs \$25 per student for the administrators to provide the course materials. How many students would have to register for the seminar for the university to break even?

Answer: 24

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

44) Administrators at a university are planning to offer a summer seminar. It costs \$3000 to reserve a room, hire an instructor, and bring in the equipment. Assume it costs \$25 per student for the administrators to provide the course materials. If we know that 20 people will attend, what price should be charged per person to break even?

Answer: \$175

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

45) Administrators at a university are planning to offer a summer seminar. It costs \$3000 to reserve a room, hire an instructor, and bring in the equipment. Assume it costs \$25 per student for the administrators to provide the course materials. If 30 students attend the seminar, how much of a profit (or loss) will be incurred?

Answer: \$750

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

46) A newly opened bed-and-breakfast projects the following:

Monthly fixed costs \$8000

Variable cost per occupied room per night \$40

Revenue per occupied room per night \$165

Write the expression for total cost per month.

Answer: $C(x) = 8000 + 40x$

Diff: 2 Page Ref: 8

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

47) A newly opened bed-and-breakfast projects the following:

Monthly fixed costs \$8000

Variable cost per occupied room per night \$40

Revenue per occupied room per night \$165

Write the expression for total revenue per month.

Answer: $R(x) = 165x$

Diff: 2 Page Ref: 8

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

48) A newly opened bed-and-breakfast projects the following:

Monthly fixed costs \$8000

Variable cost per occupied room per night \$40

Revenue per occupied room per night \$165

How many rooms would have to be occupied per month in order to break even?

Answer: 64 rooms

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

49) A script writer has received an advance against royalties of \$10000. The royalty rate is \$2 for every performance in the US, and \$3 for every performance outside the US. Define variables for this problem.

Answer: $x = \#$ of performances in the U.S.

$y = \#$ of performances outside the U.S.

Diff: 3 Page Ref: 4

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

50) A script writer has received an advance against royalties of \$10,000. The royalty rate is \$2 for every performance in the US, and \$3 for every performance outside the US. Write an expression that could be used to compute the number of performances in order to cover the advance.

Answer: $10000 = 2x + 3y$

Diff: 3 Page Ref: 8

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

51) Students are organizing a "Battle of the Bands" contest. They know that at least 100 people will attend. The rental fee for the hall is \$150 and the winning band will receive \$500. In order to guarantee that they break even, how much should they charge for each ticket?

Answer: \$6.50

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

52) A manufacturer buys peas for vegetable pies from 2 cooperatives. The price per unit is \$6 from cooperative A, and \$5.50 per unit from cooperative B. Define variables that would tell how many units to purchase from each source.

Answer: $X_1 = \#$ of units from cooperative A

$X_2 = \#$ of units from cooperative B

Diff: 3 Page Ref: 4

Main Heading: Model Building: General Concepts

Key words: break-even analysis, variable definition

53) A manufacturer buys peas for vegetable pies from 2 cooperatives. The price per unit is \$6 from cooperative A, and \$5.50 per unit from cooperative B. Develop an objective function that would minimize the total cost.

Answer: $\text{Min } 6x_1 + 5.5x_2$

Diff: 3 Page Ref: 4

Main Heading: Model Building: General Concepts

Key words: objective function, break-even analysis, model development

54) A manufacturer buys peas for vegetable pies from 2 cooperatives. The price per unit is \$6 from cooperative A, and \$5.50 per unit from cooperative B. The manufacturer needs at least 12000 units of peas. Cooperative A can supply up to 8000 units, and cooperative B can supply at least 6000 units. Develop constraints for these conditions.

Answer: $X_A + X_B \leq 12000$

$X_A \leq 8000$

$X_B \geq 6000$

Diff: 3 Page Ref: 4

Main Heading: Model Building: General Concepts

Key words: constraint, model development

55) A manager of the cereal bar at the college campus has determined that the profit made for each bowl of Morning Buzz cereal sold, x , is equal to: $Z = \$4x - 0.5x$. Each bowl of Morning Buzz weighs 6 ounces, and the manager has 12 lbs (192 ounces) of cereal available each day, which can be written as the constraint, $6x \leq 192$. How much profit will be made from Morning Buzz if it is all sold in one day?

Answer: \$112

Diff: 2 Page Ref: 4

Main Heading: Model Building: General Concepts

Key words: model development

56) The College Coffee Café buys tea from 3 suppliers. The price per pound is \$15.00 from supplier A, \$17.50 from supplier B, and \$21.00 from supplier C. They have budgeted \$175 to purchase the tea. The café needs at least 12 pounds of tea, and supplier C can supply no more than 4 pounds. Develop constraints for these conditions.

Answer: $15.00X_A + 17.50 X_B + 21X_C \leq 175$

$X_A + X_B + X_C \geq 12$

$X_C \leq 4$

Diff: 3 Page Ref: 4

Main Heading: Model Building: General Concepts

Key words: constraint, model development

57) The College Coffee Café receives a profit of \$1.25 for each cup of house tea that they sell, \$1.40 for each cup of the premium brand, and \$1.50 for each cup of their special blend that they sell. Develop an objective that maximizes profit.

Answer: $\text{Max } 1.25x_1 + 1.40x_2 + 1.50 x_3$

Diff: 2 Page Ref: 4

Main Heading: Model Building: General Concepts

Key words: objective function, model development

58) The steps of the management science process are:

A) problem definition, model construction, observation, model solution, implementation.

B) observation, problem definition, model construction, model solution, implementation.

C) model construction, problem definition, observation, model solution, implementation.

D) observation, implementation, problem definition, model construction, model solution.

Answer: B

Diff: 1 Page Ref: 2

Main Heading: The Management Science Approach to Problem Solving

Key words: steps of sci method, prob solving approach, mgt sci process

59) A model is a functional relationship that includes:

- A) variables
- B) parameters
- C) equations
- D) all of the above

Answer: D

Diff: 1 Page Ref: 3

Main Heading: The Management Science Approach to Problem Solving

Key words: model

60) Which of the following is an equation or an inequality that expresses a resource restriction in a mathematical model?

- A) a decision variable.
- B) data
- C) an objective function.
- D) a constraint.
- E) a parameter.

Answer: D

Diff: 2 Page Ref: 3

Main Heading: The Management Science Approach to Problem Solving

Key words: model, constraint

61) Which of the following is incorrect with respect to the use of models in decision making?

- A) they improve understanding of the problem
- B) they promote subjectivity in decision making
- C) they are generally easy to use
- D) they provide a systematic approach to problem solving

Answer: B

Diff: 3 Page Ref: 3

Main Heading: The Management Science Approach to Problem Solving

Key words: model, problem solving

62) The field of management science

- A) approaches decision making rationally with techniques based on the scientific method
- B) is another name for decision science and for operations research
- C) concentrates on the use of quantitative methods to assist managers in decision making
- D) all of the above

Answer: D

Diff: 1 Page Ref: 2

Main Heading: The Management Science Approach to Problem Solving

Key words: management science, operations research

- 63) The processes of problem observation
A) cannot be done until alternatives are proposed
B) requires consideration of multiple criteria
C) is the first step of decision making
D) is the final step of problem solving

Answer: C

Diff: 1 Page Ref: 2

Main Heading: The Management Science Approach to Problem Solving

Key words: observation, problem observation, management science process

- 64) The limits of the problem and the degree to which it pervades other units in the organization must be included during the _____ step of the management science process.

- A) observation
B) definition
C) solution
D) implementation

Answer: B

Diff: 1 Page Ref: 2

Main Heading: The Management Science Approach to Problem Solving

Key words: management science process

- 65) _____ involves determining the functional relationship between variables, parameters and equations

- A) Problem observation
B) Problem definition
C) Model construction
D) Model solution
E) Model implementation

Answer: C

Diff: 1 Page Ref: 3

Main Heading: The Management Science Approach to Problem Solving

Key words: management science process, model construction

- 66) Which steps of the management science process can either be a recommended decision or information that helps a manager make a decision?

- A) model implementation
B) model construction
C) problem definition
D) model solution
E) problem formulation

Answer: D

Diff: 2 Page Ref: 3

Main Heading: The Management Science Approach to Problem Solving

Key words: management science process, model solution

- 67) The quantitative analysis approach requires
- A) mathematical expressions for the relationship
 - B) uncomplicated problems
 - C) the manager to have prior experience with similar problems
 - D) all of the above

Answer: A

Diff: 2 Page Ref: 3

Main Heading: The Management Science Approach to Problem Solving

Key words: management science, operations research, quantitative analysis

- 68) The result of an effective decision making process should be monitored in order to
- A) reveal wrong assumptions
 - B) reveal errors in the implementation
 - C) insure the achievement of desired results
 - D) all of the above

Answer: D

Diff: 2 Page Ref: 7

Main Heading: The Management Science Approach to Problem Solving

Key words: decision making process

- 69) The management science process does not include
- A) problem definition
 - B) feedback
 - C) implementation
 - D) subjective preference
 - E) information

Answer: D

Diff: 2 Page Ref: 2

Main Heading: The Management Science Approach to Problem Solving

Key words: management science process

- 70) The indicator that results in total revenues being equal to total cost is called the
- A) marginal cost
 - B) marginal volume
 - C) break-even point
 - D) profit mix

Answer: C

Diff: 1 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

71) Variable cost

- A) depends on the number of units produced
- B) plus marginal cost equals fixed cost
- C) is equal to total cost in deterministic models
- D) is the same as average cost

Answer: A

Diff: 2 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

72) The components of break-even analysis are

- A) cost and profit
- B) volume and cost
- C) volume, cost and profit
- D) volume and profit

Answer: C

Diff: 1 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

73) _____ are generally independent of the volume of units produced and sold.

- A) Fixed costs
- B) Variable costs
- C) Profits
- D) average cost

Answer: A

Diff: 1 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

74) The purpose of break-even analysis is to determine the number of units of a product to sell that will

- A) appeal to the consumer
- B) result in a profit
- C) result in a loss
- D) result in zero profit

Answer: D

Diff: 2 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

75) Variable cost does not include

- A) raw materials and resources
- B) staff and management salaries
- C) material handling and freight
- D) direct labor and packaging

Answer: B

Diff: 2 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

76) Which variable is not a component of break-even analysis?

- A) fixed costs
- B) variable costs
- C) number of employees
- D) total costs
- E) number of customers

Answer: C

Diff: 1 Page Ref: 7

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

77) At the break-even point

- A) total revenue equals total cost
- B) profit is maximized
- C) revenue is maximized
- D) costs are minimized

Answer: A

Diff: 1 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

78) If the price increases but fixed and variable costs do not change, the break even point

- A) decreases
- B) increases
- C) remains the same
- D) may increase or decrease, depending on sales

Answer: A

Diff: 2 Page Ref: 10

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

79) If the price decreases but fixed and variable costs do not change, the break even point

- A) decreases
- B) increases
- C) remains the same
- D) may increase or decrease, depending on sales

Answer: B

Diff: 2 Page Ref: 10

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

80) The term _____ refers to testing how a problem solution reacts to changes in one or more of the model parameters.

- A) graphical solution
- B) decision analysis
- C) decision science
- D) sensitivity analysis
- E) break-even analysis

Answer: D

Diff: 2 Page Ref: 10

Main Heading: Model Building: Break-Even Analysis

Key words: sensitivity analysis, modeling process

81) If fixed costs decrease, but variable cost and price remain the same, the break even point

- A) decreases
- B) increases
- C) remains the same
- D) may increase or decrease depending on sales

Answer: A

Diff: 2 Page Ref: 12

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

82) If fixed costs increase, but variable cost and price remain the same, the break even point

- A) decreases
- B) increases
- C) remains the same
- D) may increase or decrease depending on sales

Answer: B

Diff: 2 Page Ref: 12

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

83) EKA manufacturing company produces Part # 2206 for the aerospace industry. Each unit of part # 2206 is sold for \$15. The unit production cost of part # 2206 is \$3. The fixed monthly cost of operating the production facility is \$3000. How many units of part # 2206 have to be sold in a month to break-even?

- A) 166.67
- B) 200
- C) 250
- D) 500
- E) 1000

Answer: C

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

84) EKA manufacturing company produces Part # 2206 for the aerospace industry. The unit production cost of part # 2206 is \$3. The fixed monthly cost of operating the production facility is \$3000. Next month's demand for part # 2206 is 200 units. How much should the company charge for each unit of part # 2206 to break-even?

- A) 10
- B) 12
- C) 15
- D) 18
- E) 20

Answer: B

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

85) A bed and breakfast even every month if they book 30 rooms over the course of a month. Their fixed cost is \$6000 per month and the revenue they receive from each booked room is \$180. What their variable cost per occupied room?

- A) \$30
- B) \$40
- C) \$48
- D) \$62

Answer: B

Diff: 3 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: brand-switching problem, Markov analysis

86) Administrators at a university will charge students \$150 to attend a seminar. It costs \$3000 to reserve a room, hire an instructor, and bring in the equipment. Assume it costs \$25 per student for the administrators to provide the course materials. How many students would have to register for the seminar for the university to break even?

- A) 16
- B) 18
- C) 20
- D) 24
- E) 30

Answer: D

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

87) A university is planning a seminar. It costs \$3000 to reserve a room, hire an instructor, and bring in the equipment. Assume it costs \$25 per student for the administrators to provide the course materials. If we know that 20 people will attend, what price should be charged per person to break even?

- A) 100
- B) 120
- C) 150
- D) 175
- E) 200

Answer: D

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

88) It costs \$50,000 to start a production process. Variable cost is \$25 per unit and revenue is \$45 per unit. What is the break even point?

- A) 1000 units
- B) 1111 units
- C) 2000 units
- D) 2500 units

Answer: D

Diff: 2 Page Ref: 9

Main Heading: Model Building: Break-Even Analysis

Key words: break-even analysis

89) Which of the following statements is false?

- A) Decision models selectively describe the managerial situation.
- B) Decision models consider all factors from the real world.
- C) Decision models designate performance measures that reflect objectives.
- D) Decision models designate decision variables.

Answer: B

Diff: 2 Page Ref: 3

Main Heading: Computer Solution

Key words: models, decision models, modeling techniques

90) A difficult aspect of using spreadsheets to solve management science problems is

- A) obtaining the solution to standard management science problems
- B) data entry
- C) performing sensitivity analysis
- D) setting up a spreadsheet with complex models and formulas

Answer: D

Diff: 2 Page Ref: 3

Main Heading: Computer Solution

Key words: computer solution, spreadsheets

91) A technique that assumes certainty in its solution is referred to as

- A) indeterminate
- B) probabilistic
- C) deterministic
- D) parametric

Answer: C

Diff: 2 Page Ref: 4

Main Heading: Management Science Modeling Techniques

Key words: modeling, models, modeling techniques

92) Classification of management science techniques does not recognize

- A) linear mathematical programming
- B) probabilistic techniques
- C) network techniques
- D) computer programming

Answer: D

Diff: 1 Page Ref: 16

Main Heading: Management Science Modeling Techniques

Key words: management science techniques, classification of techniques

93) Linear mathematical programming techniques assume that all parameters in the models are

- A) known with certainty
- B) unknown
- C) predictable
- D) unpredictable

Answer: A

Diff: 2 Page Ref: 16

Main Heading: Management Science Modeling Techniques

Key words: management science techniques

94) Decision analysis is a _____ technique.

- A) linear mathematical programming
- B) probabilistic
- C) network
- D) simulation
- E) non-linear programming technique

Answer: B

Diff: 1 Page Ref: 17

Main Heading: Management Science Modeling Techniques

Key words: management science techniques

95) Which one of the following techniques is not a mathematical programming technique?

- A) linear programming models
- B) transportation models
- C) analytical hierarchy process
- D) goal programming
- E) integer linear programming technique

Answer: C

Diff: 2 Page Ref: 17

Main Heading: Management Science Modeling Techniques

Key words: management science techniques

96) Which one of the following management science methods is not a probabilistic technique?

- A) assignment models
- B) decision analysis
- C) queuing analysis
- D) statistical analysis

Answer: A

Diff: 2 Page Ref: 17

Main Heading: Management Science Modeling Techniques

Key words: management science techniques

97) A baker uses organic flour from a local farmer in all of his baked goods. For each batch of bread (x_1), he uses 4 lbs. For a batch of cookies (x_2), he uses 3 pounds, and for a batch of muffins (x_3) he uses 2 pounds. The local farmer can supply him with no more than 24 pounds per week. The constraint that represents this condition is:

A) $x_1 \leq 8, x_2 \leq 8, x_3 \leq 8$

B) $x_1 + x_2 + x_3 \geq 24$

C) $x_1 \leq 6, x_2 \leq 8, x_3 \leq 12$

D) $x_1 + x_2 + x_3 \leq 24$

E) $4x_1 + 3x_2 + 2x_3 \leq 24$

Answer: E

Diff: 3 Page Ref: 4

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Key words: constraints

98) An objective function

A) is a part of a model

B) represents the objective of the firm

C) can represent costs or profits

D) A and B only

E) all of the above

Answer: E

Diff: 2 Page Ref: 4

Main Heading: Management Science Modeling Techniques

Key words: objective function, model construction

99) Larry's Fish Market buys salmon (S) for \$5 per pound and a local whitefish (W) for \$3.50 per pound. Larry wants to minimize his cost, but he cannot spend more than \$160. The objective function that minimizes these costs for Larry is:

A) $5S + 3.5W = 160$

B) $5S + 3.5W \leq 160$

C) $\text{Min } 5S + 3.5W$

D) $\text{Max } 5S + 3.5W$

E) $5S + 3.5W \geq 160$

Answer: C

Diff: 3 Page Ref: 4

Main Heading: Management Science Modeling Techniques

Key words: objective function, model construction

100) Taco Bell used which of the following management science techniques to help save over \$53 million?

- A) linear programming and network analysis
- B) forecasting, queuing theory and inventory analysis
- C) goal programming and network analysis
- D) forecasting, simulation and integer programming

Answer: D

Diff: 3 Page Ref: 6

Main Heading: Management Science Modeling Techniques

Key words: management science, management scientist