***Business Analytics, 2e, GE* (Evans)**

**Chapter 11SpreadsheetModeling and Analysis**

1) In the equation to calculate the economic value of a customer, *V* = *R* × *F* × *M*/*D*, how is the value for *F* estimated?

A) It is estimated to be the total number of purchases the customer has made.

B) It is estimated to be the number of visits of the customer without actually spending on an item.

C) It is estimated to be the purchase frequency per year.

D) It is estimated to be the number of customers defecting per year.

Answer: C

Diff: 1

Blooms: Remember

Topic: Logic-Driven Modeling

LO1: Develop analytic models mathematically using logic-driven approaches.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

2) Troista Mobile Accessories sells mobile apps on their Web site. If a customer spends on average, $12 per visit and visits the Web site 20 times each year, what is the average nondiscounted gross profit during a customer's lifetime? Given that Troista makes a margin of 60 percent on the average bill, with 25 percent of customers not returning each year.

A) $30

B) $75

C) $360

D) $576

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Develop analytic models mathematically using logic-driven approaches.

LO2: Use a modern software tool to perform statistical calculations.

3) Which of the following is necessary to calculate the variable cost of production for the company to develop a profit model?

A) unit sale price

B) quantity of item produced

C) quantity of item sold

D) fixed cost of production

Answer: B

Diff: 1

Blooms: Understand

Topic: Logic-Driven Modeling

LO1: Develop analytic models mathematically using logic-driven approaches.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

4) In which of the following ways does demand influence profit?

A) It predicts how many units will be sold.

B) It directly influences the fixed cost of production.

C) It helps in reducing the variable cost of production.

D) It reduces the unit cost of production.

Answer: A

Diff: 1

Blooms: Understand

Topic: Logic-Driven Modeling

LO1: Develop analytic models mathematically using logic-driven approaches.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

5) Which of the following formulas is used to calculate the total studio recording cost?

A) =SUM(B6:B12)-B10

B) (B6+B7-B16)B12

C) B6+B7\*B12

D) B6+B7\*B12-B16

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Apply principles of spreadsheet engineering to designing and implementing spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

6) Which of the following formulas are used to calculate the In-house recording cost?

A) B10\*B12

B) B10\*B12-B17

C) B6+B10\*B12

D) =SUM(B6:B12)-B7

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Apply principles of spreadsheet engineering to designing and implementing spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

7) Which of the following formula is used to make the recording decision in B20?

A) =IF(B19>0,"In-house","Studio")

B) =IF(B19<=0,"Studio","In-house")

C) =SUM(B19<=0,"Studio")

D) =IF(B19>0,"Studio","In-house")

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO2: Use a modern software tool to perform statistical calculations.

Using the spreadsheet below to answer the following question(s).

The spreadsheet below shows the net income model for a company that sells shoes.

|  |  |  |
| --- | --- | --- |
|  | A | B |
| 1 | **Net Income Model** |  |
| 2 |  |  |
| 3 | **Data** |  |
| 4 |  |  |
| 5 | Sales | $10,000,000 |
| 6 | Cost of Goods Sold | $ 6,400,000 |
| 7 | Administrative Expenses | $ 500,000 |
| 8 | Selling Expenses | $ 900,000 |
| 9 | Depreciation Expenses | $ 750,000 |
| 10 | Interest Expenses | $ 70,000 |
| 11 | Taxes | $ 620,000 |
| 12 |  |  |
| 13 | **Model** |  |
| 14 |  |  |
| 15 | Gross Profit | $ 3,600,000 |
| 16 | Operating Expenses | $ 2,150,000 |
| 17 | Net Operating Income | $ 1,450,000 |
| 18 | Earnings Before Taxes | $ 1,380,000 |
| 19 |  |  |
| 20 | Net Income |  |

8) Which of the following formulas would be used to calculate the net income value using only the data value?

A) =SUM(B5:B10)-B11

B) =SUM(B5:B11)

C) =B5-SUM(B6:B11)

D) =B5-SUM(B6:B10)+B11

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Apply principles of spreadsheet engineering to designing and implementing spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

9) Which of the following would be used to calculate the gross profit?

A) =SUM(B7:B11)-B6

B) =B5-B6

C) =B5-(B6-B11)

D) =B5-B6+(B11-B10)

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Apply principles of spreadsheet engineering to designing and implementing spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

10) Which of the following formulas would be used to calculate the operating expenses?

A) =SUM(B7:B10)

B) =SUM(B7:B9)

C) =SUM(B7:B9)-B6

D) =SUM(B7:10)-B11

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Apply principles of spreadsheet engineering to designing and implementing spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

11) Which of the following formulas would be used to calculate the net operating income?

A) =B15-B5

B) =B15-B16

C) =SUM(B6:B10)-B11

D) =B15-B16+B6

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Apply principles of spreadsheet engineering to designing and implementing spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

12) Which of the following formulas would be used to calculate earnings before taxes?

A) =B15-B16+B6

B) =B15-B5

C) =B15-B16

D) =B17-B10

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Apply principles of spreadsheet engineering to designing and implementing spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

13) Which of the following formulas would be used to calculate the net income value using only the information in the Model, and not in the Data section?

A) =B5-B17

B) =B6-B15

C) =B15-B16-B17+B18

D) =B18-B11

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Apply principles of spreadsheet engineering to designing and implementing spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

Use the table below to answer the following question(s).

Below is the profit model spreadsheet for the Lazarus Shoe Company producing their latest model of shoes for the month of January.

|  |  |
| --- | --- |
| Profit Model for Lazarus  Shoe Company for January | (All cost in $) |
|  |  |
| Unit Price | 47 |
| Unit Cost | 22 |
| Fixed Cost for Production | 350,000 |
| Demand | 40,000 |
|  |  |
| Model |  |
|  |  |
| Unit Price | 47 |
| Quantity Sold | 38,000 |
| Revenue |  |
|  |  |
| Unit Cost | 22 |
| Quantity Produced | 38,000 |
| Variable Cost |  |
| Fixed Cost | 350,000 |
|  |  |
| Profit |  |

14) Calculate the revenue for units sold.

A) $836,000

B) $1,136,000

C) $600,000

D) $1,786,000

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

15) Calculate the variable cost of production.

A) $1,786,000

B) $836,000

C) $600,000

D) $1,436,000

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

16) Calculate the total profit.

A) $600,000

B) $1,436,000

C) $836,000

D) $1,786,000

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

Use the table below to answer the following question(s).

Dresden Pharmaceuticals has decided to go ahead and start clinical trials on a potential new drug. The total R&D costs are estimated to reach around $875,000,000 with clinical trials mounting to $145,000,000. The current market size is estimated to be around 3,000,000 and is expected to grow at 4 percent every year. The market share Dresden hopes to capture in the first year is 7 percent, and is projected to grow by 25 percent each year for the next 4 years. A monthly prescription is anticipated to generate revenue of $420 while incurring variable costs of $150. A discount rate of 8 percent is assumed.

|  |  |
| --- | --- |
| **Dresden Pharmaceuticals** |  |
|  |  |
| **Data** |  |
|  |  |
| **Market Size** | 3,000,000 |
| **Unit (monthly Rx) revenue ($)** | 420 |
| **Unit (monthly Rx) cost ($)** | 150 |
| **Discount Rate ( per cent)** | 8 |
|  |  |
| **Project Costs** |  |
| **R&D ($)** | 875,000,000 |
| **Clinical Trials ($)** | 145,000,000 |
|  |  |

17) Calculate the projected sales for the first year.

A) 273,000

B) 210,000

C) 378,000,000

D) 268,230

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

18) Calculate the market size for the second year.

A) 3,000,000

B) 273,000

C) 3,244,800

D) 3,120,000

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

19) Calculate the market share percentage in the third year.

A) 25 percent

B) 4 percent

C) 11 percent

D) 7 percent

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

20) Calculate the annual revenue for the fourth year.

A) $ 2,325,304,800

B) $830,466,000

C) $1,494,838,800

D) $1,149,876,000

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

21) Calculate the annual cost incurred for the second year.

A) $1,224,120,000

B) $884,520,000

C) $491,400,000

D) $638,820,000

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

22) Calculate the projected profit for the third year.

A) $31,315,200

B) $2,373,996,000

C) $1,149,876,000

D) $1,494,838,800

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

23) Calculate cumulative net profit at the fourth year.

A) $1,073,538,462

B) $3,189,634,800

C) $1,312,041,240

D) $1,494,838,800

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

24) Calculate the net present value for Dresden's new drug.

A) $1,312,041,240

B) ($339,600,000)

C) $3,702,463,939

D) ($932,028,690)

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

25) Which of the following years shows the first profit for Dresden's new drug?

A) first year

B) second year

C) third year

D) fourth year

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

26) Which of the following is the root cause for the newsvendor problem?

A) uncertainty in supply

B) uncertainty in demand

C) high cost per unit sale

D) high total production cost

Answer: B

Diff: 1

Blooms: Understand

Topic: Logic-Driven Modeling

LO1: Describe the newsvendor problem and implement it on a spreadsheet.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

27) Which of the following conditions is the optimal solution to the newsvendor problem, where *Q* is the quantity to be purchased, and *D* is demand?

A) *Q*>*D*

B) *Q* = *D*

C) *D*>*Q*

D) *Q* / *D* = 0

Answer: B

Diff: 1

Blooms: Understand

Topic: Logic-Driven Modeling

LO1: Describe the newsvendor problem and implement it on a spreadsheet.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

Use the table below to answer the following question(s).

SujitoElectronix makes headphones for $22 and sells them for $32. Sujito has sold at least 50 headphones on average per week in the past, though the actual demand is unknown. Sujito has also often run short of supply in the past. After three months of release, the headphones are sold at 40 percent discount. The spreadsheet below shows Sujito's sales and demand for the headphones. We take demand at 51, and quantity produced at 55.

|  |  |
| --- | --- |
| **Newsvendor model for**  **Sujito's headphones** |  |
|  |  |
| **Data** |  |
|  |  |
| **Selling Price** | $32 |
| **Cost** | $22 |
| **Discount Price** | $19.2 |
|  |  |
| **Model** |  |
|  |  |
| **Demand** | 51 |
| **Produced Quantity** | 55 |
|  |  |
| **Quantity Sold** |  |
| **Surplus Quantity** |  |

28) Which of the following is the value for quantity sold?

A) 51

B) 50

C) 4

D) 55

Answer: A

Diff: 1

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Describe the newsvendor problem and implement it on a spreadsheet.

LO2: Use a modern software tool to perform statistical calculations.

29) Calculate the net profit for the headphones.

A) $586.8

B) $498.8

C) $1653.8

D) $466.8

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Describe the newsvendor problem and implement it on a spreadsheet.

LO2: Use a modern software tool to perform statistical calculations.

Use the table below to answer the following question(s).

Below is a room overbooking model spreadsheet for the Metza, a hotel chain. The hotel has 425 rooms priced at $180 per day each, and is usually fully booked. Reservations can be cancelled any time before 5:00 p.m. with no penalty. The hotel estimates an average overbooking cost of $150. Customer demand is set at 400 with an average cancellation of 20.

|  |  |  |
| --- | --- | --- |
|  | A | B |
| 1 | **Hotel Overbooking Model for the Metza group of hotels** |  |
| 2 |  |  |
| 3 | **Data** |  |
| 4 |  |  |
| 5 | **Rooms Available** | 425 |
| 6 | **Price per room** | $180 |
| 7 | **Overbooking Cost** | $150 |
| 8 |  |  |
| 9 | **Model** |  |
| 10 |  |  |
| 11 | **Reservation Limit** | 425 |
| 12 | **Customer Demand** | 400 |
| 13 | **Reservation Made** |  |
| 14 | **Cancellations** | 20 |
| 15 | **Customer Arrivals** |  |
| 16 | **Overbooked Customers** |  |

30) Calculate the customer arrivals at the Metza.

A) 425

B) 405

C) 400

D) 380

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Describe how overbooking decisions can be modeled on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

31) Which of the following is the excel formula used to estimate overbooked customers?

A) =MIN(0,B5-B15)

B) =MAX(0,B15-B5)

C) =MAX(B11,B12)

D) =MIN(B11-B12,B11-B14)

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Describe how overbooking decisions can be modeled on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

32) Calculate the net revenue.

A) $72,900

B) $76,500

C) $64,650

D) $68,400

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Describe how overbooking decisions can be modeled on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

Use the table below to answer the following question(s).

Sheila joined SimsinTradings at the age of 36 with a starting salary of $75,000. She expects a salary increase of 5 percent every year. Her retirement plan requires her to pay 9 percent of her salary, while the company matches it at 32 percent. She expects an annual return of 7 percent on her retirement portfolio. Using a predictive model for Sheila's first five years, calculate the following, assuming that the salary increases at the same rate every year, and the return of interest does not change.

|  |  |
| --- | --- |
| **Retirement Plan Model for Sheila** |  |
|  |  |
| **Data** |  |
|  |  |
| **Retirement Contribution ( percent of salary)** | 9 percent |
| **Employer Match** | 32 percent |
| **Annual Salary Increase** | 5 percent |
| **Annual Return on Investment** | 7 percent |

33) What will be Sheila's salary in her second year of work at Simsin?

A) $81,750

B) $82,688

C) $78,750

D) $ 75,000

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Explain how model validity can be assessed.

LO2: Use a modern software tool to perform statistical calculations.

34) What will be the amount of employee contribution to retirement plan when Sheila has reached the age of 38?

A) $7,441.88

B) $7,813.97

C) $24,450

D) $2381.40

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Explain how model validity can be assessed.

LO2: Use a modern software tool to perform statistical calculations.

35) Calculate the employer contribution in Sheila's fourth year at Simsin.

A) $546.98

B) $703.26

C) $2,500.47

D) $2,160

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Explain how model validity can be assessed.

LO2: Use a modern software tool to perform statistical calculations.

36) What's the total retirement balance when Sheila has reached the age of 40 while working with Simsin?

A) $108,374.54

B) $56,253.36

C) $53,627.87

D) $91,163

Answer: B

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Explain how model validity can be assessed.

LO2: Use a modern software tool to perform statistical calculations.

Use the table below to answer the following question(s).

Fiberia Accessories, a clothing retailer, is planning to introduce a new line of sweaters as part of the winter collection for $65 with an inventory of 1500. The main selling season is 60 days between November and December. The store then sells the remaining units in a clearance sale at 65 percent discount. Out of the 60 main retail days, Fiberia sells the sweaters at full retail price for only 45 days, while giving a discount of 25 percent for the remaining 15 days. The demand functions *a*, and *b* are given as 79.5 and 1.1 respectively.

|  |  |
| --- | --- |
| **Marked Down Pricing Model for**  **FiberiaAccessories's new sweater** |  |
|  |  |
| **Data** |  |
|  |  |
| **Retail Price** | $65 |
| **Inventory** | 1500 |
| **Selling Season (days)** | 60 |
| **Days at Full Retail** | 45 |
| **Intermediate Markdown** | 25 percent |
| **Clearance Markdown** | 65 percent |
| **Demand Function** |  |
| **A** | 79.5 |
| **B** | 1.1 |

37) What is the average daily sale during the full retail sales period?

A) 15

B) 33.33

C) 8

D) 24.55

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Data-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

38) Calculate the total number of units sold during the full retail sales period.

A) 33.33

B) 520

C) 187.5

D) 360

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Data-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

39) Calculate the total revenue during the full retail sales period.

A) $23,400

B) $16,200

C) $2,880

D) $17,550

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Data-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

40) Calculate the daily sales during the discount sales period.

A) 39.28

B) 133.3

C) 388.13

D) 25.88

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Data-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

41) Calculate the total units sold during the discount sales period.

A) 388.13

B) 25.88

C) 133.3

D) 39.28

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Data-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

42) Calculate the total revenue during the discount sales period.

A) $4,478.91

B) $18,921.09

C) $10,042.73

D) $43,321.09

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Data-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

43) Calculate the revenue for the clearance sales period.

A) $18,921.09

B) $23,400

C) $48,871.88

D) $17,105.16

Answer: D

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Data-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

44) Calculate the total revenue for the new line of sweaters.

A) $59,426.25

B) $48,871.88

C) $23,400

D) $43,231.09

Answer: A

Diff: 1

Blooms: Apply

AACSB: Analytic Skills

Topic: Data-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

Use the table below to answer the following question(s).

In the spreadsheet below, there is data on the price, cost, demand, and quantity produced for an item. There are also different "what if" values that can help a manager to calculate costs and revenue with variability in demand.

|  |  |  |  |
| --- | --- | --- | --- |
|  | A | B | C |
| 1 | **Profit Model** |  |  |
| 2 |  |  |  |
| 3 | **Data** |  | ***What-If* Demand Values** |
| 4 |  |  | 20,000 |
| 5 | **Unit Price ($)** | 50 | 40,000 |
| 6 | **Unit Cost ($)** | 25 | 55,000 |
| 7 | **Fixed Cost ($)** | 550,000 | 60,000 |
| 8 | **Demand** | 60,000 | 65,000 |
| 9 | **Quantity Produced** | 55,000 |  |
| 10 |  |  |  |

45) Which of the following is the Excel formula to determine the number of units sold?

A) =B8

B) =MIN(0,B8,B9)

C) =MIN(B8,B9)

D) =MAX(0,B8,B9)

Answer: C

Diff: 1

Blooms: Apply

AACSB: Analytic Skills

Topic: Data-Driven Modeling

LO1: Perform what-if analysis on spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

46) Calculate the total revenue when the quantity produced is 55,000 and demand is 60,000.

A) $1,375,000

B) ($1,320,000)

C) $1,430,000

D) $2,750,000

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Analyzing Uncertainty and Model Assumptions

LO1: Perform what-if analysis on spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

47) Calculate the variable cost when the demand is 60,000 units.

A) $1,430,000

B) $1,375,000

C) $2,750,000

D) $1,320,000

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Analyzing Uncertainty and Model Assumptions

LO1: Perform what-if analysis on spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

48) From the "what if" values, calculate the revenue if the demand is 60,000 units.

A) $2,750,000

B) $825,000

C) $75,000

D) $1,375,000

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Analyzing Uncertainty and Model Assumptions

LO1: Perform what-if analysis on spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

49) From the "what if" values, calculate the total cost when demand is 40,000.

A) $ 2,000,000

B) $1,925,000

C) $1,100,000

D) $75,000

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Analyzing Uncertainty and Model Assumptions

LO1: Perform what-if analysis on spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

50) From the "what if" values, calculate the total profit when the demand is 20,000.

A) $825,000

B) $1,000,000

C) $1,100,000

D) ($925,000)

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Analyzing Uncertainty and Model Assumptions

LO1: Perform what-if analysis on spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

51) From the "what if" values, calculate the net profit when the demand is 65,000.

A) $825,000

B) $1,650,000

C) $800,000

D) $925,000

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Analyzing Uncertainty and Model Assumptions

LO1: Perform what-if analysis on spreadsheet models.

LO2: Use a modern software tool to perform statistical calculations.

52) \_\_\_\_\_\_\_\_ is the term used by *Analytic Solver Platform* for systematic methods of "what-if" study.

A) Scenario

B) Validity

C) Parametric sensitivity analysis

D) Goal Seek

Answer: C

Diff: 1

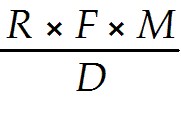
Blooms: Remember

Topic: Model Analysis Using Analytic Solver Platform

LO1: Create data tables and tornado charts using Analytic Solver Platform.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

53) Calculate the economic value of a loyal customer for a company given that the customer purchases, on an average, worth $43worth per visit and comes three times a year. The company's gross profit margin is 35 per cent with a customer defection rate of 0.4.

Answer: The economic value of a loyal customer is, V, and it is calculated as *V* =  ,

where, *R* = revenue per purchase;

*F* = purchase frequency per year;

*M* = gross profit margin;

*D* = defection rate.

From the data provided;

*R* = $43;

*F* = 3;

*M* = 35/100 = 0.35;

*D* = 0.4,

Therefore *V* = (43 × 3 × 0.35)/0.4 = $112.88

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Develop analytic models mathematically using logic-driven approaches.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

54) Gruten Retailers sells Mother's Day special greeting cards at their store at $6. They make the cards for a dollar apiece. Most of the cards are sold by Mother's Day, but the actual demand is unknown. They have orders for 120 cards. In the past, they have had sales of at least 100 cards by Mother's Day. The remaining cards are sold at a 40 percent discount. Calculate the net profit, if demand, *D*, is set at 110 units.

Answer: Net profit is calculated as,

(*R* × quantity sold + *S* × surplus quantity) - (*C* × *Q)*,

where, *R* = selling price, *S*, salvage value, *C* is the cost per unit, and *Q*, the quantity purchased.

From the data provided:

*R* = $6

*S* = $6(1-0.4) = $3.6

*C* = 1

*Q* = 120

Quantity sold will be the minimum value between demand and quantity purchased which is 110 units here and surplus quantity is 10.

Therefore, net profit = 6 × 110 + 3.6 × 10 - 1 × 120 = $576.

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Describe the newsvendor problem and implement it on a spreadsheet.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

55) Brenton joined the Kroos Corporation at a starting salary of $61,500. According to the company's retirement plan, Brenton has to make a retirement contribution of 6 percent of his salary. The company contributes 30 percent of this amount. Brenton is expected to receive a salary increment of 3.5 percent per year for the next three years. Brenton is also expected to receive an annual investment return of 8 percent on the plan. Assuming the same rate of salary increases and investment returns each year, calculate the total balance of the retirement plan in its second year.

Answer: Brenton joined the Kroos Corporation at $61,500. At an annual increment of 3.5 percent, Brenton's salary in the second year would be

= 61,500 × (1 + 0.035) = $63,652.50. …. (1)

Brenton's contribution to the retirement plan = (1) × 6 percent

= 63,625.5 × 6/100 = $3,819.15. …. (2)

The employer contribution is 30 percent of (2)

Therefore, the employer contribution for the second year

= 3,819.15 × 30/100 = 3,819.15 × 0.3 = $1,145.75. …. (3)

In order to calculate the total balance for the second year, we must also calculate the retirement plan balance of the previous year.

Brenton's starting salary is $61,500.

Therefore, his contribution in the first year

= 61,500 × 0.06 = $3,690. …. (4)

The employer contribution for the first year

= 3,690 × 0.3 = $1,107. …. (5)

Therefore, the balance for the first year is calculated as (4) + (5)

= 3,690 + 1,107 = $4,797. …. (6)

From (6), we can now calculate the balance for the second year using the investment return on the retirement plan.

Therefore, total balance for the second year

= (6) × (1 + 0.08) + (2) + (3)

= (4,796 × 1.08) + 3,819.15 + 1,145.75

= $10,145.66.

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Logic-Driven Modeling

LO1: Implement mathematical decision models on spreadsheets.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

56) Blue Sunset Band is planning to record a new album. A major decision to be made is if the band can record the album on their own, or if they should hire a studio to record it with. The fixed cost for recording at the studio is $100,000, plus the manufacturing cost per CD, which is at $5. If they record the album in-house, the cost per CD is $10. They plan to produce 3000 copies of the album regardless of the place of recording. If the band wished to break even with the cost, how can they achieve this by using the Goal Seek feature in Excel?

|  |  |  |
| --- | --- | --- |
|  | A | B |
| 1 | **The Blue Sunset Band**  **Album Recording Decision** |  |
| 2 |  |  |
| 3 | **Data** |  |
| 4 |  |  |
| 5 | Recording at Studio |  |
| 6 | Fixed Cost | $ 100,000 |
| 7 | Unit CD Cost | $ 5 |
| 8 |  |  |
| 9 | Recording In-house |  |
| 10 | Unit CD Cost | $ 10 |
| 11 |  |  |
| 12 | Production Volume | 3000 |
| 13 |  |  |
| 14 | **Model** |  |
| 15 |  |  |
| 16 | Total studio manufacturing cost | $ 115,000 |
| 17 | Total in-house manufacturing cost | $ 30,000 |
| 18 |  |  |
| 19 | Cost Difference | $ 85,000 |
| 20 | Recording Decision | In-house |

Answer: The break-even point is the value of demand volume for which total in-house manufacturing cost equals total manufacturing cost in studio, or, equivalently, for which the cost difference is zero.

Therefore, you seek to find the value of production volume in cell B12 that yields a value of zero in cell B19.

In the *Goal Seek* dialog, enter B19 that contains the formula for the *Set cell*, enter 0 in the *Tovalue* box, and enter B12 in the *By changing cell* box.

The *Goal Seek* tool determines that the break-even volume is 20,000 and enters this value in cell B12 in the model.

|  |  |  |
| --- | --- | --- |
|  | A | B |
| 1 | **The Blue Sunset Band**  **Album Recording Decision** |  |
| 2 |  |  |
| 3 | **Data** |  |
| 4 |  |  |
| 5 | Recording at Studio |  |
| 6 | Fixed Cost | $ 100,000 |
| 7 | Unit CD Cost | $ 5 |
| 8 |  |  |
| 9 | Recording In-house |  |
| 10 | Unit CD Cost | $ 10 |
| 11 |  |  |
| 12 | Production Volume | 20,000 |
| 13 |  |  |
| 14 | **Model** |  |
| 15 |  |  |
| 16 | Total studio manufacturing cost | $ 200,000 |
| 17 | Total in-house manufacturing cost | $ 200,000 |
| 18 |  |  |
| 19 | Cost Difference | $ 0 |
| 20 | Recording Decision | In-house |

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Analyzing Uncertainty and Model Assumptions

LO1: Apply the Excel Goal Seek tool for break-even analysis and other types of models.

LO2: Use a modern software tool to perform statistical calculations.

57) The process of developing good, useful, and correct spreadsheet models is known as spreadsheet engineering.

Answer: TRUE

Diff: 1

Blooms: Remember

AACSB: Analytic Skills

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Use Excel features and spreadsheet engineering to ensure the quality of your spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

58) In predictive modeling, validity refers to how well a model represents reality.

Answer: TRUE

Diff: 1

Blooms: Remember

Topic: Logic-Driven Modeling

LO1: Explain how model validity can be assessed.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

59) Two-way data tables can evaluate only one output variable.

Answer: TRUE

Diff: 1

Blooms: Remember

Topic: Analyzing Uncertainty and Model Assumptions

LO1: Construct one- and two-way data tables.

LO2: Apply the major types of one-way and two-way analyses of variables

60) In Excel's *Analytic Solver Platform,* a parameter is a set of outputs in a model.

Answer: FALSE

Diff: 1

Blooms: Remember

Topic: Model Analysis Using Analytic Solver Platform

LO1: Create data tables and tornado charts using Analytic Solver Platform.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

61) Give an account of how the design and format of spreadsheets can be improved.

Answer: A logical design of the spreadsheet should be sketched after inputs, outputs, and key model relationships are well understood. For example, the spreadsheet should resemble a financial statement to make it easier for managers to read. It is good practice to separate the model inputs from the model itself and to reference the input cells in the model formulas; that way, any changes in the inputs will be automatically reflected in the model as shown in the text examples. Another useful approach is to break complex formulas into smaller pieces. This reduces typographical errors, makes it easier to check your results, and also makes the spreadsheet easier to read for the user. Finally, it is also important to set up the spreadsheet in a form that the end user, like a financial manager, can easily interpret and use.

Diff: 1

Blooms: Understand

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Use Excel features and spreadsheet engineering to ensure the quality of your spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

62) Explain how the Data Validation feature in Excel helps in increasing spreadsheet quality.

Answer: The *Data Validation* feature allows you to define restrictions on what data can or should be entered in a cell. For example, it does not make sense to input a quantity produced that is not a whole number. You can prevent users from entering data that are not valid or allow users to enter invalid data but warn them when they try to type it in the cell. You can also provide messages to define what input you expect for the cell, and instructions to help users correct any errors. *Data Validation* can be found in the *Data Tools* group in the *Data* tab in the Excel ribbon.

Diff: 1

Blooms: Understand

Topic: Spreadsheet Modeling and Spreadsheet Engineering

LO1: Use Excel features and spreadsheet engineering to ensure the quality of your spreadsheets.

LO2: Use a modern software tool to perform statistical calculations.

63) Give an account of how data is used in predictive models.

Answer: Data used in models can come from subjective judgment based on past experience, existing databases and other data sources, analysis of historical data, or surveys, experiments, and other methods of data collection. For example, in the profit model, querying accounting records for values of the unit cost and fixed costs. Statistical methods are often used to estimate data required in predictive models. For example, historical data is used to compute the mean demand; quartiles or percentiles are used in the model to evaluate different scenarios. However, even if data are not available, using a good subjective estimate is better than sacrificing the completeness of a model that may be useful.

Diff: 1

Blooms: Remember

Topic: Logic-Driven Modeling

LO1: Develop analytic models mathematically using logic-driven approaches.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

64) Discuss how overbooking decisions are made by service businesses.

Answer: An important operations decision for service businesses such as hotels, airlines, and car-rental companies is the number of reservations to accept to effectively fill capacity knowing that some customers may not use their reservations or tell the business. If a hotel, for example, holds rooms for customers who do not show up, they lose revenue opportunities. A common practice in these industries is to overbook reservations. When more customers arrive than can be handled, the business usually incurs some cost to satisfy them. Therefore, the decision becomes how much to overbook to balance the costs of overbooking against the lost revenue for underuse.

Diff: 1

Blooms: Remember

Topic: Logic-Driven Modeling

LO1: Describe how overbooking decisions can be modeled on spreadsheets.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

65) How can managers judge the validity of a model?

Answer: Models cannot capture every detail of the real problem, and managers must understand the limitations of models and their underlying assumptions. Validity refers to how well a model represents reality. One approach for judging the validity of a model is to identify and examine the assumptions made in a model to see how they agree with our perception of the real world; the closer the agreement, the higher the validity. A "perfect" model corresponds to the real world in every respect; unfortunately, no such model has ever existed and never will exist in the future, because it is impossible to include every detail of real life in one model. To add more realism to a model generally requires more complexity and analysts have to know how to balance these.

Diff: 1

Blooms: Remember

Topic: Logic-Driven Modeling

LO1: Explain how model validity can be assessed.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

66) Explain how a two-way data table is created.

Answer: To create a two-way data table, type a list of values for one input variable in a column and a list of input values for the second input variable in a row, starting one row above and one column to the right of the column list. In the cell in the upper left-hand corner immediately above the column list and to the left of the row list, enter the cell reference of the output variable you wish to evaluate. Select the range of cells that contain this cell reference and both the row and column of values. On the What-If Analysis menu, click Data Table. In the Row input cell of the dialog box, enter the reference for the input cell in the model that corresponds to the input values in the row. In the Column input cell box, enter the reference for the input cell in the model that corresponds to the input values in the column. Then click OK.

Diff: 1

Blooms: Remember

Topic: Analyzing Uncertainty and Model Assumptions

LO1: Construct one- and two-way data tables.

LO2: Identify different business uses for statistics and the major statistical tools businesses use

67) How does a tornado chart help make sense of inputs in analyzing data and models?

Answer: A tornado chart shows which inputs are the most influential on the output and which are the least influential. If these inputs are uncertain, then you would probably want to study the more influential ones to reduce uncertainty and its effect on the output. If the effects are small, you might ignore any uncertainty or eliminate those effects from the model. They are also useful in helping you select the inputs that you would want to analyze further with data tables or scenarios.

Diff: 1

Blooms: Remember

Topic: Model Analysis Using Analytic Solver Platform

LO1: Create data tables and tornado charts using Analytic Solver Platform.

LO2: Identify different business uses for statistics and the major statistical tools businesses use