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

**Chapter 12Monte Carlo Simulation and Risk Analysis**

1) Which of the following best defines Monte Carlo simulation?

A) It is a tool for building statistical models that characterize relationships among a dependent variable and one or more independent variables.

B) It is a collection of techniques that seeks to group or segment a collection of objects into subsets.

C) It is the process of selecting values of decision variables that minimizes or maximizes some quantity of interest.

D) It is the process of generating random values for uncertain inputs in a model and computing the output variables of interest.

Answer: D

Diff: 1

Blooms: Remember

Topic: Spreadsheet Models with Random Variables

LO1: Use data tables to conduct simple Monte Carlo simulations.

2) Why is the ROUND function used in Excel?

A) to ensure that the values generated are whole numbers

B) to ensure that the values generated are multiples of ten

C) to ensure that the values generated are always positive

D) to ensure that the values are even numbers

Answer: A

Diff: 1

Blooms: Remember

Topic: Spreadsheet Models with Random Variables

LO1: Use data tables to conduct simple Monte Carlo simulations.

3) Which of the following statements is true of a triangular distribution?

A) We are required to know only the smallest and largest possible values that the variable might assume.

B) These distributions depend on multiple parameters that one can easily identify based on managerial knowledge and judgment.

C) The distribution has a limited range and can be skewed in either direction.

D) The distribution is very positively skewed, with no negative values.

Answer: C

Diff: 1

Blooms: Remember

Topic: Spreadsheet Models with Random Variables

LO1: Use data tables to conduct simple Monte Carlo simulations.

4) How does the *Risk Solver Platform* define an uncertain function cell?

A) It is a cell that contains a triangular distribution function.

B) It is a cell in which a distribution of output values is created from the model.

C) It is a cell in which an uncertain variable is used to define a distribution.

D) It is a cell that can only be defined by discrete distributions.

Answer: B

Diff: 1

Blooms: Remember

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

5) Which of the following is a parameter in the Normal Distribution Dialog of the Risk Solver Platform?

A) maximum value

B) minimum value

C) most likely value

D) mean

Answer: D

Diff: 1

Blooms: Remember

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

6) Which option in Risk Solver Platform allows you to choose the number of times that random values can be generated for the uncertain cells in the model?

A) Trials per Simulation

B) Simulations to Run

C) Only Run

D) Sim.Random Seed

Answer: A

Diff: 1

Blooms: Remember

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

7) Monte Carlo sampling differs from Latin Hypercube sampling in that the Monte Carlo sampling \_\_\_\_\_\_\_\_.

A) results in a more even distribution of output values

B) uses the entire range of the distribution in a more consistent manner

C) selects random variates independently over the entire range of possible values of the distribution

D) uses an uncertain variable whose probability distribution is divided into intervals of equal probability

Answer: C

Diff: 2

Blooms: Understand

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

8) Latin Hypercube sampling differs from Monte Carlo sampling in that the Latin Hypercube sampling \_\_\_\_\_\_\_\_.

A) selects random variates independently over the entire range of possible values of the distribution

B) uses an uncertain variable whose probability distribution is divided into intervals of equal probability

C) is used for evaluating the model performance under various what-if scenarios

D) achieves less accurate forecast statistics for a fixed number of trials

Answer: B

Diff: 2

Blooms: Understand

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

Consider the following spreadsheet for an outsourcing decision model.

|  |  |  |
| --- | --- | --- |
|  | A | B |
| 1 | **Outsourcing Decision Model** |  |
| 2 |  |  |
| 3 | **Data** |  |
| 4 |  |  |
| 5 | **Manufactured in-house** |  |
| 6 | Fixed cost | $ 60,000 |
| 7 | Unit variable cost | $ 130 |
| 8 |  |  |
| 9 | **Purchased from supplier** |  |
| 10 | Unit cost | $ 165 |
| 11 |  |  |
| 12 | Demand volume | 1,000 |
| 13 |  |  |
| 14 | **Model** |  |
| 15 |  |  |
| 16 | Total manufacturing cost |  |
| 17 | Total purchased cost |  |
| 18 |  |  |
| 19 | Difference |  |
| 20 | Decision |  |

We assume that the production (demand) volume is normally distributed with a mean of 1,000 and a standard deviation of 100. For the unit cost, select the triangular distribution. It has a minimum value of $150, most likely value of $165, and a maximum value of $190. The number of trials per simulation is equal to 5,000 at a Sim. Random Seed of 1. Run the simulation and answer the following question(s) using the Risk Solver Platform.

9) What is the value of mean obtained from the simulation results? [Hint: Choose the nearest answer]

A) $18,385

B) $21,608

C) $14,894

D) $23,946

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

10) What is the value of standard deviation obtained from the simulation results?

A) $9,175

B) $7,884

C) $3,860

D) $12,870

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

11) What is the value of mode obtained from the simulation results?

A) $28,435

B) $22,485

C) $27,198

D) $25,394

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

12) What is the value of mean absolute deviation obtained from the simulation results?

A) $10,893

B) $3,476

C) $7,443

D) $5,885

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

13) What is the expected loss determined from the simulation results?

A) $(78)

B) $(120)

C) $(60)

D) $(47)

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

14) What is the cost difference lower cutoff in thousands of dollars if the likelihood is 60%?

A) approximately 13.56

B) approximately 22.45

C) approximately 29.67

D) approximately 38.97

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

15) What is the cost difference upper cutoff in thousands of dollars if the likelihood is 75%?

A) approximately 46

B) approximately 28

C) approximately 32

D) approximately 59

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

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

Below is a spreadsheet for Trance Electronics.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F |
| 1 | **Trance Electronics** |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 | **Data** |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 | Market size | 20,000,000 |  |  |  |  |
| 6 | Unit (monthly Rx) revenue | $ 120.00 |  |  |  |  |
| 7 | Unit (monthly Rx) cost | $ 50.00 |  |  |  |  |
| 8 | Discount rate | 8% |  |  |  |  |
| 9 |  |  |  |  |  |  |
| 10 | Project costs |  |  |  |  |  |
| 11 | R&D | $ 750,000,000 |  |  |  |  |
| 12 | Clinical Trials | $ 100,000,000 |  |  |  |  |
| 13 | Total Project Costs |  |  |  |  |  |
| 14 |  |  |  |  |  |  |
| 15 | **Model** |  |  |  |  |  |
| 16 |  |  |  |  |  |  |
| 17 | Year | 1 | 2 | 3 | 4 | 5 |
| 18 | Market growth factor |  | 4% | 4% | 4% | 4% |
| 19 | Market size |  |  |  |  |  |
| 20 | Market share growth rate |  | 18% | 18% | 18% | 18% |
| 21 | Market share | 7% |  |  |  |  |
| 22 | Sales |  |  |  |  |  |
| 23 |  |  |  |  |  |  |
| 24 | Annual revenue |  |  |  |  |  |
| 25 | Annual costs |  |  |  |  |  |
| 26 | Profit |  |  |  |  |  |
| 27 | Cumulative net profit |  |  |  |  |  |
| 28 |  |  |  |  |  |  |
| 29 | Net present value |  |  |  |  |  |

Suppose that the project manager of Trance Electronics has identified the following uncertain variables in the model and the distributions and parameters that describe them, as follows:

**Market size:** normal with mean of 20,000,000 units and standard deviation of 4,000,000 units.

**R&D costs**: uniform between $600,000,000 and $800,000,000.

**Clinical trial costs**: lognormal with mean of $150,000,000 and standard deviation $30,000,000.

**Annual market growth factor**: triangular with minimum = 2%, maximum = 6%, and most likely = 3%.

**Annual market share growth rate**: triangular with minimum = 15%, maximum = 25%, and most likely = 20%.

The number of trials per simulation is equal to 10,000 at a Sim. Random Seed of 2. Run the simulation and answer the following questions using the Risk Solver Platform.

16) What is the standard deviation obtained from the simulation results of the net present value? [Hint: Choose the approximate value.]

A) $204,868,924

B) $162,135,408

C) $182,992,245

D) $138,134,040

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

17) What is the coefficient of variation obtained from the simulation results of the net present value?

A) 1.78392

B) -2.23958

C) -1.36659

D) 2.87645

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

18) What is the expected loss ratio obtained from the simulation results of the net present value?

A) 93.50%

B) 72.45%

C) 67.32%

D) 86.32%

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

19) What is the expected value margin obtained from the simulation results of the net present value?

A) 0.864

B) -0.726

C) 0.343

D) -0.467

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

20) What is the risk that the net present value over the 5 years will not be positive?

A) approximately 40%

B) approximately 57%

C) approximately 24%

D) approximately 77%

Answer: D

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

21) What are the chances that the product will show a cumulative net profit in the fourth year?

A) approximately 25%

B) approximately 18%

C) approximately 11%

D) approximately 32%

Answer: C

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

22) What cumulative profit in the fifth year is likely to be realized with a probability of 0.50?

A) $78,244,098

B) $101,970,955

C) $144,058,696

D) $203,676,827

Answer: B

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

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

23) What is the correlation of the market size with the NPV with reference to the sensitivity chart?

A) 0.043

B) 0.888

C) -0.341

D) -0.026

Answer: B

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Construct and interpret sensitivity, overlay, trend, and box-whisker charts for a simulation model.

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

24) What is the correlation of the R&D cost with the NPV with reference to the sensitivity chart?

A) -0.404

B) 0.028

C) 0.908

D) -0.194

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Construct and interpret sensitivity, overlay, trend, and box-whisker charts for a simulation model.

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

25) With reference to the trend chart, which year shows the highest mean net cumulative profit?

A) Year 1

B) Year 2

C) Year 4

D) Year 5

Answer: D

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Construct and interpret sensitivity, overlay, trend, and box-whisker charts for a simulation model.

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

26) With reference to the trend chart, which year shows the highest uncertainty in forecasting the future?

A) Year 1

B) Year 3

C) Year 4

D) Year 5

Answer: D

Diff: 2

Blooms: Understand

AACSB: Analytic Skills

Topic: New-Product Development Model

LO1: Construct and interpret sensitivity, overlay, trend, and box-whisker charts for a simulation model.

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

27) The *Risk Solver Platform* \_\_\_\_\_\_\_\_ feature allows you to determine the influence that each uncertain model input has individually on an output variable based on its correlation with the output variable.

A) trend chart

B) sensitivity chart

C) overlay chart

D) box-whisker chart

Answer: B

Diff: 1

Blooms: Remember

Topic: New-Product Development Model

LO1: Construct and interpret sensitivity, overlay, trend, and box-whisker charts for a simulation model.

28) The *Risk Solver Platform* \_\_\_\_\_\_\_\_ feature allows you to superimpose the frequency distributions from selected forecasts on one chart in order to compare differences and similarities that might not be apparent.

A) trend chart

B) sensitivity chart

C) overlay chart

D) box-whisker chart

Answer: C

Diff: 1

Blooms: Remember

Topic: New-Product Development Model

LO1: Construct and interpret sensitivity, overlay, trend, and box-whisker charts for a simulation model.

29) If a simulation has multiple output variables that are related to one another, the distributions of all output variables can be viewed on a single *Risk Solver Platform* chart called a(n) \_\_\_\_\_\_\_\_.

A) trend chart

B) sensitivity chart

C) overlay chart

D) box-whisker chart

Answer: A

Diff: 1

Blooms: Remember

Topic: New-Product Development Model

LO1: Construct and interpret sensitivity, overlay, trend, and box-whisker charts for a simulation model.

30) The *Risk Solver Platform* \_\_\_\_\_\_\_\_ chart shows the minimum, first quartile, median, third quartile, and maximum values in a data set graphically.

A) trend

B) sensitivity

C) overlay

D) box-whisker

Answer: D

Diff: 1

Blooms: Remember

Topic: New-Product Development Model

LO1: Construct and interpret sensitivity, overlay, trend, and box-whisker charts for a simulation model.

Answer the following question(s) using the Risk Solver Platform (5000 trials per simulation; use the Latin Hypercube sampling method).

Consider the spreadsheet for a Newsvendor Model.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E |
| 1 | **Newsvendor Model** |  |  | **Historical Candy Sales** | **$ 264.00** |
| 2 |  |  |  | 50 | $ 264.00 |
| 3 | **Data** |  |  | 45 | $ 264.00 |
| 4 |  |  |  | 40 | $ 228.00 |
| 5 | Selling price | $ 18.00 |  | 46 | $ 264.00 |
| 6 | Cost | $ 12.00 |  | 43 | $ 255.00 |
| 7 | Discount price | $ 9.00 |  | 43 | $ 255.00 |
| 8 |  |  |  | 46 | $ 264.00 |
| 9 | **Model** |  |  | 42 | $ 246.00 |
| 10 |  |  |  | 44 | $ 264.00 |
| 11 | Demand | 44 |  | 43 | $ 255.00 |
| 12 | Purchase Quantity | 44 |  | 47 | $ 264.00 |
| 13 |  |  |  | 41 | $ 237.00 |
| 14 | Quantity Sold |  |  | 41 | $ 237.00 |
| 15 | Surplus Quantity |  |  | 45 | $ 264.00 |
| 16 |  |  |  | 51 | $ 264.00 |
| 17 | Profit |  |  | 43 | $ 255.00 |
| 18 |  |  |  | 45 | $ 264.00 |
| 19 |  |  |  | 42 | $ 246.00 |
| 20 |  |  |  | 44 | $ 264.00 |
| 21 |  |  |  | 48 | $ 264.00 |
| 22 |  |  | **Average Profit** |  |  |

31) Which of the following cells is defined as the uncertain function cell?

A) B12

B) B14

C) B15

D) B17

Answer: D

Diff: 1

Blooms: Apply

AACSB: Analytic Skills

Topic: Newsvendor Model

LO1: Conduct Monte Carlo simulation using historical data and resampling techniques.

32) What is the value of mean profit?

A) $255.90

B) $251.45

C) $245.98

D) $264.00

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Newsvendor Model

LO1: Conduct Monte Carlo simulation using historical data and resampling techniques.

33) What is the value of standard deviation?

A) $12.50

B) $10.99

C) $15.86

D) $20.25

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Newsvendor Model

LO1: Conduct Monte Carlo simulation using historical data and resampling techniques.

34) What is the value of mode?

A) $228

B) $245

C) $255

D) $264

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Newsvendor Model

LO1: Conduct Monte Carlo simulation using historical data and resampling techniques.

35) What is the value of mean absolute deviation?

A) $8.91

B) $5.45

C) $12.35

D) $15.64

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Newsvendor Model

LO1: Conduct Monte Carlo simulation using historical data and resampling techniques.

36) What is the purchase quantity lower cutoff if the likelihood is 75%?

A) 264

B) 255

C) 246

D) 228

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Newsvendor Model

LO1: Conduct Monte Carlo simulation using historical data and resampling techniques.

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

Below is a spreadsheet for a hotel overbooking model.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E |
| 1 | **Hotel Overbooking Model** |  |  | Demand | Probability |
| 2 |  |  |  | 290 | 0.03 |
| 3 | **Data** |  |  | 295 | 0.05 |
| 4 |  |  |  | 300 | 0.08 |
| 5 | Rooms available | 350 |  | 305 | 0.12 |
| 6 | Price | $ 120 |  | 310 | 0.15 |
| 7 | Overbooking cost | $ 100 |  | 315 | 0.20 |
| 8 |  |  |  | 320 | 0.15 |
| 9 | **Model** |  |  | 325 | 0.10 |
| 10 |  |  |  | 330 | 0.05 |
| 11 | Reservation limit | 350 |  | 335 | 0.04 |
| 12 | Customer demand | 320 |  | 340 | 0.02 |
| 13 | Reservations made |  |  | 345 | 0.01 |
| 14 | Cancellations | 15 |  |  |  |
| 15 | Customer arrivals |  |  |  |  |
| 16 |  |  |  |  |  |
| 17 | Overbooked customers |  |  |  |  |
| 18 | Net revenue |  |  |  |  |

Assume that each reservation has a constant probability *p* = 0.04 of being cancelled. Answer the question(s) using the Risk Solver Platform.

37) With respect to B12, what is the range for values given in the Parameters section in the Discrete dialog?

A) $E$2:$E$13

B) $D$2:$D$8

C) $D$2:$D$13

D) $E$2:$E$8

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Overbooking Model

LO1: Define and use custom distributions in Monte Carlo simulations.

38) With respect to B12, what is the range of weights given in the Parameters section in the Discrete dialog?

A) $E$2:$E$13

B) $D$2:$D$8

C) $D$2:$D$13

D) $E$2:$E$8

Answer: A

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Overbooking Model

LO1: Define and use custom distributions in Monte Carlo simulations.

39) With respect to B14, what should the number of trials correspond to in the Parameters section of the Binomial dialog?

A) reservation limit

B) customer demand

C) reservations made

D) customer arrivals

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Overbooking Model

LO1: Define and use custom distributions in Monte Carlo simulations.

40) Which of the following cells is defined as an output cell?

A) B13

B) B14

C) B15

D) B17

Answer: D

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Overbooking Model

LO1: Define and use custom distributions in Monte Carlo simulations.

41) A normal distribution has a limited range and can be skewed in either direction.

Answer: FALSE

Diff: 1

Blooms: Remember

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

42) Uniform or triangular distributions are used in the absence of data.

Answer: TRUE

Diff: 1

Blooms: Remember

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

43) As Monte Carlo simulation is essentially statistical sampling, the larger the number of trials used, the more precise is the result.

Answer: TRUE

Diff: 1

Blooms: Remember

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

44) Using an empirical distribution precludes sampling values outside the range of the actual data.

Answer: TRUE

Diff: 1

Blooms: Remember

Topic: Newsvendor Model

LO1: Use fitted distributions to define uncertain variables in a simulation.

45) Monte Carlo simulation is an inappropriate tool to analyze cash budgets because of the inherent uncertainty of the sales forecasts on which most cash budgets are based.

Answer: FALSE

Diff: 1

Blooms: Remember

Topic: Cash Budget Model

LO1: Correlate uncertain variables in a simulation model using Risk Solver Platform.

46) What is Monte Carlo simulation?

Answer: Monte Carlo simulation is the process of generating random values for uncertain inputs in a model, computing the output variables of interest, and repeating this process for many trials in order to understand the distribution of the output results. It can easily be accomplished for the outsourcing model using a data table.

Diff: 1

Blooms: Remember

Topic: Spreadsheet Models with Random Variables

LO1: Use data tables to conduct simple Monte Carlo simulations.

47) Explain the process of running a simulation using *Risk Solver Platform*.

Answer: To run a simulation, first click on the Options button in the Options group in the *Risk Solver Platform* ribbon. This displays a dialog in which the number of trials and other options to run the simulation are specified. Trials per Simulation allows the user to choose the number of times that *Risk Solver Platform* will generate random values for the uncertain cells in the model and recalculate the entire spreadsheet. The larger the number of trials, the more precise will be the result. Every time the model is run, slightly different results are produced because of sampling error. This can be controlled by changing the value of *Sim. Random Seed* in the dialog.

Diff: 1

Blooms: Remember

Topic: Monte Carlo Simulation Using Risk Solver Platform

LO1: Use Risk Solver Platform to develop, implement, and analyze Monte Carlo simulation models.

48) What are the benefits of a *Risk Solver Platform* sensitivity chart?

Answer: The sensitivity chart feature allows the user to determine the influence that each uncertain model input has individually on an output variable based on its correlation with the output variable. It provides three benefits: (1) It tells the user which uncertain variables influence output variables the most and which would benefit from better estimates. (2) It tells the user which uncertain variables influence output variables the least and can be ignored or discarded altogether. (3) By providing understanding of how the uncertain variables affect the model, it allows the development of more realistic spreadsheet models and improves the accuracy of the results.

Diff: 1

Blooms: Remember

Topic: New-Product Development Model

LO1: Construct and interpret sensitivity, overlay, trend, and box-whisker charts for a simulation model.

49) What are three types of *Risk Solver Platform* charts used to obtain multiple simulation results?

Answer: The overlay chart feature allows you to superimpose the frequency distributions from selected forecasts on one chart in order to compare differences and similarities that might not be apparent.

If a simulation has multiple output variables that are related to one another, the distributions of all output variables can be viewed on a single chart called a trend chart. A box-whisker chart shows the minimum, first quartile, median, third quartile, and maximum values in a data set graphically.

Diff: 1

Blooms: Remember

Topic: New-Product Development Model

LO1: Construct and interpret sensitivity, overlay, trend, and box-whisker charts for a simulation model.

50) Explain the concept of the "flaw of averages."

Answer: The average values for the uncertain inputs cannot be used in a decision model and therefore, the need for Monte Carlo simulation cannot be eliminated. Dr. Sam Savage, a strong proponent of spreadsheet modeling, coined the term the "flaw of averages" to describe this phenomenon. This states that the evaluation of a model output using the average value of the input is not necessarily equal to the average value of the outputs when evaluated with each of the input values.

Diff: 1

Blooms: Remember

Topic: Newsvendor Model

LO1: Explain the significance of the "flaw of averages."