

## Assignment: Chapter 10 Assignment

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## Questions

## Problem 10-03 Algo (What-If Analysis)

Question 1 of 5

1

2

Only Visited, Not Judged

3

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5

Hint(s) Check My Work

Eastman Publishing Company is considering publishing an electronic textbook about spreadsheet applications for business. The fixed cost of manuscript preparation, textbook design, and web-site construction is estimated to be \$170,000. Variable processing costs are estimated to be \$6 per book. The publisher plans to sell single-user access to the book for \$52.

- (a) Build a spreadsheet model in Excel to calculate the profit/loss for a given demand. What profit can be anticipated with a demand of 3,600 copies? For subtractive or negative numbers use a minus sign.

\$ 

- (b) Use a data table to vary demand from 1,000 to 6,000 in increments of 200 to test the sensitivity of profit to demand. Breakeven occurs where profit goes from a negative to a positive value, that is, breakeven is where total revenue = total cost yielding a profit of zero. In which interval of demand does breakeven occur?

- (i) Breakeven appears in the interval of 3,200 to 3,400 copies.  
(ii) Breakeven appears in the interval of 3,600 to 3,800 copies.  
(iii) Breakeven appears in the interval of 3,800 to 4,000 copies.  
(iv) Breakeven appears in the interval of 4,000 to 4,200 copies.

- (c) Use Goal Seek to determine the access price per copy that the publisher must charge to break even with a demand of 3,600 copies. If required, round your answer to two decimal places.

\$

interval of demand does breakeven occur?

- (i) Breakeven appears in the interval of 3,200 to 3,400 copies.
- (ii) Breakeven appears in the interval of 3,600 to 3,800 copies.
- (iii) Breakeven appears in the interval of 3,800 to 4,000 copies.
- (iv) Breakeven appears in the interval of 4,000 to 4,200 copies.

- Select your answer - v

(c) Use Goal Seek to determine the access price per copy that the publisher must charge to break even with a demand of 3,600 copies. If required, round your answer to two decimal places.

\$

(d) Consider the following scenarios:

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Variable Cost/Book	\$6	\$9	\$7	\$10	\$11
Access Price	\$52	\$42	\$48	\$45	\$50
Demand	1,500	2,200	5,000	5,500	1,000

For each of these scenarios, the fixed cost remains \$170,000. Use Scenario Manager to generate a summary report that gives the profit for each of these scenarios. Which scenario yields the highest profit? Which scenario yields the lowest profit? For subtractive or negative numbers use a minus sign.

- Select your answer - v yields the highest profit of \$

- Select your answer - v yields the lowest profit of \$

Hint(s) Check My Work

Assignment: Chapter 10 Assignment

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◀ Question 2 of 5 ▶

Questions

Problem 10-05 Algo (What-If Analysis)

Hint(s) Check My Work

- 1.
- 2.
- 3.  Not Answered
- 4.
- 5.

University of Cincinnati Center for Business Analytics is an outreach center that collaborates with industry partners on applied research and continuing education in business analytics. One of the programs offered by the center is a quarterly Business Intelligence Symposium. Each symposium features three speakers on the real-world use of analytics. Each corporate member of the center (there are currently 10) receives seven free seats to each symposium. Nonmembers wishing to attend must pay \$75 per person. Each attendee receives breakfast, lunch, and free parking. The following are the costs incurred for putting on this event:

Rental cost for the auditorium:	\$150
Registration Processing:	\$8.50 per person
Speaker Costs:	3@\$800 = \$2,400
Continental Breakfast:	\$4.00 per person
Lunch:	\$7.00 per person
Parking:	\$5.00 per person

(a) The Center for Business Analytics is considering a refund policy for no-shows. No refund would be given for members who do not attend, but nonmembers who do not attend will be refunded 50% of the price. Build a spreadsheet model that calculates a profit or loss based on the number of nonmember registrants. Account for the fact that, historically, 25% of members who registered do not show and 10% of registered nonmembers do not attend. The center pays the caterer for breakfast and lunch based on the number of registrants (not the number of attendees). However, the center only pays for parking for those who attend. What is the profit if each corporate member registers their full allotment of tickets and 127 nonmembers register? If required, round your answers to two decimal places.

\$

(b) Use a two-way data table to show how profit changes as a function of number of registered nonmembers and the no-show percentage of nonmembers. Vary number of nonmember registrants from 80 to 160 in increments of 5 and the percentage of nonmember no-shows from 0% to 25% in increments of 5%. What is the maximum profit that can occur if the percentage of nonmember no-

Parking: \$5.00 per person

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\$

- (b) Use a two-way data table to show how profit changes as a function of number of registered nonmembers and the no-show percentage of nonmembers. Vary number of nonmember registrants from 80 to 160 in increments of 5 and the percentage of nonmember no-shows from 10% to 30% in increments of 2%. In which interval of nonmember registrants does breakeven occur if the percentage of nonmember no-shows is 22%?

Breakeven appears in the interval of  to  registered nonmembers.

- (c) Consider three scenarios:

	Base Case	Worst Case	Best Case
% of Members Who Do Not Show	25%	50%	20%
% of Nonmembers Who Do Not Show	10%	30%	4%
Number of Nonmember Registrants	137	105	185

All other inputs are the same as in part (a). Use Scenario Manager to generate a summary report that gives the profit for each of these three scenarios. What is the highest profit? What is the lowest profit? If required, round your answers to two decimal places. For subtractive or negative numbers use a minus sign.

The highest profit is \$ .

The lowest profit is \$ .

Questions

Problem 10-13 Algo (Some Useful Excel Functions for Modeling)

Hint(s) Check My Work

- 1.
- 2.
- 3.
- 4.
- 5.

Richardson Ski Racing (RSR) sells equipment needed for downhill ski racing. One of RSR's products is fencing used on downhill courses. The fence product comes in 150-foot rolls and sells for \$215 per roll. However, RSR offers quantity discounts. The following table shows the price per roll depending on order size:

Quantity Ordered		Price per Roll
From	To	
1	100	\$215
101	200	\$195
201	400	\$175
401	and up	\$155

Click on the datafile logo to reference the data.



(a) Use the VLOOKUP function with the preceding pricing table to determine the total revenue from these orders.

\$

(b) Use the COUNTIF function to determine the number of orders in each price bin.

From	To	Price per Roll	Number of Orders
1	100	\$215	<input type="text"/>
101	200	\$195	<input type="text"/>
201	400	\$175	<input type="text"/>
401	and up	\$155	<input type="text"/>

172

201                      400                      \$175

401                      and up                      \$155

Click on the datafile logo to reference the data.



(a) Use the VLOOKUP function with the preceding pricing table to determine the total revenue from these orders.

\$

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From	To	Price per Roll	Number of Orders
1	100	\$215	<input type="text"/>
101	200	\$195	<input type="text"/>
201	400	\$175	<input type="text"/>
401	and up	\$155	<input type="text"/>
			172

[Hint\(s\)](#) [Check My Work](#)

Icon Key

2.

3.

4.

5.

Hint(s) Check My Work

A put option in finance allows you to sell a share of stock at a given price in the future. There are different types of put options. A European put option allows you to sell a share of stock at a given price, called the exercise price, at a particular point in time after the purchase of the option. For example, suppose you purchase a six-month European put option for a share of stock with an exercise price of \$26. If six months later, the stock price per share is \$26 or more, the option has no value. If in six months the stock price is lower than \$26 per share, then you can purchase the stock and immediately sell it at the higher exercise price of \$26. If the price per share in six months is \$22.50, you can purchase a share of the stock for \$22.50 and then use the put option to immediately sell the share for \$26. Your profit would be the difference,  $\$26 - \$22.50 = \$3.50$  per share, less the cost of the option. If you paid \$1.00 per put option, then your profit would be  $\$3.50 - \$1.00 = \$2.50$  per share. The point of purchasing a European option is to limit the risk of a decrease in the per-share price of the stock. Suppose you purchased 200 shares of the stock at \$28 per share and 80 six-month European put options with an exercise price of \$26. Each put option costs \$1.

**(a)** Using data tables, construct a model that shows the value of the portfolio with options and without options for a share price in six months between \$20 and \$29 per share in increments of \$1.00. What is the benefit of the put options on the portfolio value for the different share prices? For subtractive or negative numbers use a minus sign even if there is a + sign before the blank (Example: -300). If you answer is zero, enter "0".

Share Price	Benefit of Options
\$20	\$ <input type="text"/>
\$21	\$ <input type="text"/>
\$22	\$ <input type="text"/>
\$23	\$ <input type="text"/>
\$24	\$ <input type="text"/>
\$25	\$ <input type="text"/>
\$26	\$ <input type="text"/>
\$27	\$ <input type="text"/>
\$28	\$ <input type="text"/>
\$29	\$ <input type="text"/>

the stock at \$28 per share and 80 six-month European put options with an exercise price of \$26. Each put option costs \$1.

(a) Using data tables, construct a model that shows the value of the portfolio with options and without options for a share price in six months between \$20 and \$29 per share in increments of \$1.00. What is the benefit of the put options on the portfolio value for the different share prices? For subtractive or negative numbers use a minus sign even if there is a + sign before the blank (Example: -300). If you answer is zero, enter "0".

Share Price	Benefit of Options
\$20	\$ <input type="text"/>
\$21	\$ <input type="text"/>
\$22	\$ <input type="text"/>
\$23	\$ <input type="text"/>
\$24	\$ <input type="text"/>
\$25	\$ <input type="text"/>
\$26	\$ <input type="text"/>
\$27	\$ <input type="text"/>
\$28	\$ <input type="text"/>
\$29	\$ <input type="text"/>

(b) Discuss the value of the portfolio with and without the European put options.

The lower the stock price, the  beneficial the put options. The options are worth nothing at a stock price of \$  or . There is a benefit from the put options to the overall portfolio for stock prices of \$  or .

[Hint\(s\)](#) [Check My Work](#)

Icon Key

3. 4. 5. [Hint\(s\)](#) [Check My Work](#)

Floyd's Bumpers has distribution centers in Lafayette, Indiana; Charlotte, North Carolina; Los Angeles, California; Dallas, Texas; and Pittsburgh, Pennsylvania. Each distribution center carries all products sold. Floyd's customers are auto repair shops and larger auto parts retail stores. You are asked to perform an analysis of the customer assignments to determine which of Floyd's customers should be assigned to each distribution center. The rule for assigning customers to distribution centers is simple: A customer should be assigned to the closest center. The worksheet *Floyds* in the provided datafile contains the distance from each of Floyd's 1,029 customers to each of the five distribution centers. Your task is to build a list that tells which distribution center should serve each customer. The following functions will be helpful:

$=\text{MIN}(\text{array})$

The MIN function returns the smallest value in a set of numbers. For example, if the range A1:A3 contains the values 6, 25, and 38, then the formula  $=\text{MIN}(A1:A3)$  returns the number 6, because it is the smallest of the three numbers:

$=\text{MATCH}(\text{lookup\_value}, \text{lookup\_array}, \text{match type})$

The MATCH function searches for a specified item in a range of cells and returns the relative position of that item in the range. The *lookup\_value* is the value to match, the *lookup\_array* is the range of search, and *match type* indicates the type of match (use 0 for an exact match).

For example, if the range A1:A3 contains the values 6, 25, and 38, then the formula  $=\text{MATCH}(25,A1:A3,0)$  returns the number 2, because 25 is the second item in the range.

$=\text{INDEX}(\text{array}, \text{column\_num})$

The INDEX function returns the value of an element in a position of an array. For example, if the range A1:A3 contains the values 6, 25, and 38, then the formula  $=\text{INDEX}(A1:A3, 2)$  returns 25, because 25 is the value in the second position of the array A1:A3. (Hint: Create three new columns. In the first column, use the MIN function to calculate the minimum distance for the customer in that row. In the second column use the MATCH function to find the position of the minimum distance. In the third column, use the position in the previous column with the INDEX function referencing the row of distribution center names to find the name of the distribution center that should service that customer.)

Click on the datafile logo to reference the data.



(Hint: The INDEX function may be used with a two-dimensional array:  $=\text{INDEX}(\text{array}, \text{row\_num}, \text{column\_num})$ , where *array* is a matrix, *row\_num* is the row numbers and *column\_num* is the column position of the desired element of the matrix.)

Formula  $=\text{MIN}(A1:A3)$  returns the number 6, because it is the smallest of the three numbers.

$=\text{MATCH}(\text{lookup\_value}, \text{lookup\_array}, \text{match type})$

The MATCH function searches for a specified item in a range of cells and returns the relative position of that item in the range. The *lookup\_value* is the value to match, the *lookup\_array* is the range of search, and *match type* indicates the type of match (use 0 for an exact match).

For example, if the range A1:A3 contains the values 6, 25, and 38, then the formula  $=\text{MATCH}(25,A1:A3,0)$  returns the number 2, because 25 is the second item in the range.

$=\text{INDEX}(\text{array}, \text{column\_num})$

The INDEX function returns the value of an element in a position of an array. For example, if the range A1:A3 contains the values 6, 25, and 38, then the formula  $=\text{INDEX}(A1:A3, 2)$  returns 25, because 25 is the value in the second position of the array A1:A3. (Hint: Create three new columns. In the first column, use the MIN function to calculate the minimum distance for the customer in that row. In the second column use the MATCH function to find the position of the minimum distance. In the third column, use the position in the previous column with the INDEX function referencing the row of distribution center names to find the name of the distribution center that should service that customer.)

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(Hint: The INDEX function may be used with a two-dimensional array:  $=\text{INDEX}(\text{array}, \text{row\_num}, \text{column\_num})$ , where *array* is a matrix, *row\_num* is the row numbers and *column\_num* is the column position of the desired element of the matrix.)

Floyd's Bumpers pays a transportation company to ship its product to its customers. Floyd's Bumpers ships full truckloads to its customers. Therefore, the cost for shipping is a function of the distance traveled and a fuel surcharge (also on a per mile basis). The cost per mile is \$2.45 and the fuel surcharge is \$.56 per mile. The worksheet May in the provided datafile contains data for shipments for the month of May (each record is simply the customer zip code for a given truckload shipment), as well as the distance table from the distribution centers to each customer. Use the VLOOKUP function to retrieve the distance traveled for each shipment from the exercise completed above, and calculate the charge for each shipment. What is the total amount that Floyd's Bumpers spends on these May shipments?

If required, round your answers to two decimal places.

\$

[Hint\(s\)](#) [Check My Work](#)