Quiz 4 solutions and explanations

Quiz 4 Solutions & Explanations

Everyday Excel, Part 2

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Hello there! This document is meant to provide clear explanations for the Quiz 4 questions (not the in-video quizzes since they have explanations already). I do NOT provide feedback during the quiz (like I do for the screencasts) because a learner could just guess, obtain the correct answers, then put them back into the quiz and get 100%!

This document is purely for you to learn more and to correct your misconceptions about the material. If you view this document soon after you take the quiz to see why you missed a certain question, it will serve as a great learning tool!

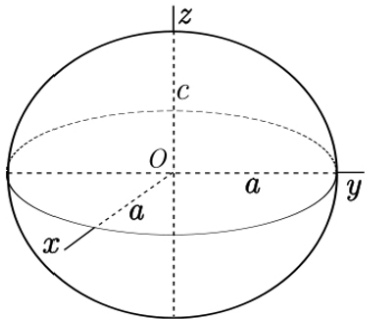
PLEASE DO NOT SHARE THIS DOCUMENT WITH ANYONE! Using this document to complete Quiz 4 is a violation of Coursera's Honor Code (a.k.a. cheating).

NOTE that the order of the answers on Coursera are random and likely different from the order shown here (in general but not always, I like to start with the correct answers followed by the incorrect ones).

Question 1:

The volume of a spheroid (shown in figure) is given by the following equation. We wish to perform a two-way case study to determine the simultaneous effects that the values of **a** and **c** have on the volume of the spheroid.

$$V = \frac{4}{3}\pi a^2 c$$



We have performed a two-way Data Table and here are the results:

	A	B	C	D	E	F
1	a	2				
2	c	1				
3						
4	V	16.76				
5						
6				c		
7		16.76	0.3	0.6	0.9	1.2
8		1	1.26	2.51	3.77	5.03
9		1.5	2.83	5.65	8.48	11.31
10		2	5.03	10.05	15.08	20.11
11	a	2.5	7.85	15.71	23.56	31.42
12		3	11.31	22.62	33.93	45.24
13		3.5	15.39	30.79	46.18	61.58
14		4	20.11	40.21	60.32	80.42
15						

In the **Data Table** tool, what did we use for the **Row input cell** and what did we use for the **Column input cell**?

Correct answer: Row input cell = **B2**; Column input cell = **B1**

Explanation: In the data table, the **Row input vector** is comprised of cells **C7:F7**, which corresponds to variable **c** and can be manipulated in cell **B2** of the worksheet. Therefore, the **Row input cell** is cell **B2**. The column input vector, corresponding to variable **a**, is comprised of cells **B8:B14**, , which can be manipulated in cell **B1** of the worksheet. Therefore, the **Column input cell** is cell **B1**.

Question 2:

Revisit the wind chill equation that we saw earlier in the week:

$$Wind\ Chill\ (°\mathrm{F}) = 35.74 + 0.6215T - 35.75\left(V^{0.16}\right) + 0.4275\left(V^{0.16}\right)$$

T is temperature in deg F and **V** is wind velocity in mph. If the temperature outside is 20 deg F, what must be the wind velocity (**V**) in order for the wind chill to be 0 degrees? Enter your answer rounded to the nearest degree (ones place).

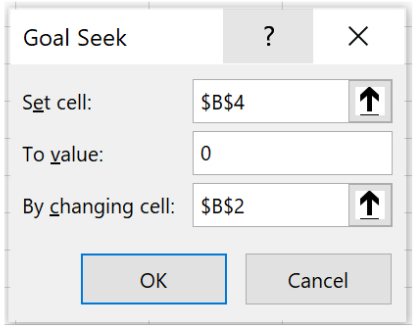
Correct answer: **7**

Explanation: This is a targeting problem, which we can set up in Excel and solve using either the Goal Seek tool or the Solver.

	A	B
1	T	20
2	V	10
3		
4	WC	-2.88655

The formula in cell B4 is: **=35.74+0.6215*T-35.75*V^0.16+0.4275*V^0.16**

We can put in a guess for V (10 in the above setup) then have the Goal Seek tool adjust V until WC = 0:



And the result:

	A	B
1	T	20
2	V	6.950782
3		
4	WC	-1.9E-05

Question 3:

If we wanted to maximize the function f(x,y) shown in the spreadsheet setup below but we also have the constraint that x + y must equal 4, how would we fill out the Solver box?

	A	B
1	x	1
2	y	1
3		
4	f(x,y)	0
5	x+y	2
6		
7	$f(x,y) = x^2y - y$	

Correct answer: We would Set Objective: **B4**, To: **Max**, By Changing Variable Cells: **B1:B2**, Subject to the Constraint: **B5 = 4**.

Explanation: Here, we have two objectives: we wish to maximize cell **B4** by changing cells **B1** and **B2** (x and y) but we also have a constraint that x + y = 2. We would fill out the Solver box as indicated above.

Question 4:

Which of the following statements are **TRUE**? Select all that apply.

A. The Goal Seek tool can be used to find the maximum of a function.

FALSE. No, the Goal Seek tool can only be used for targeting problems by changing a single input cell.

B. The Goal Seek tool can be used to find where a function of multiple variables (multiple input cells) is equal to zero.

FALSE. No, the Goal Seek tool can only be used for targeting problems by changing a single input cell.

C. The Goal Seek tool can be used to solve targeting problems.

TRUE. Yes, this is the main purpose of the Goal Seek tool, as long as only one input is being changed.

D. The Solver tool can be used to solve targeting problems.

TRUE. Yes the Solver tool can be used to solve targeting problems and has the ability to change multiple input cells.

E. The Solver tool can be used to maximize two objective cells.

FALSE. The Solver tool can only be used to maximize (or minimize) a single cell.

Question 5:

The equations to calculate the volume and surface area of a cone are given below:

$$V_{cone} = \frac{\pi r^2 h}{3}$$

$$SA_{cone} = \pi r^2 + \pi r \cdot \sqrt{r^2 + h^2}$$

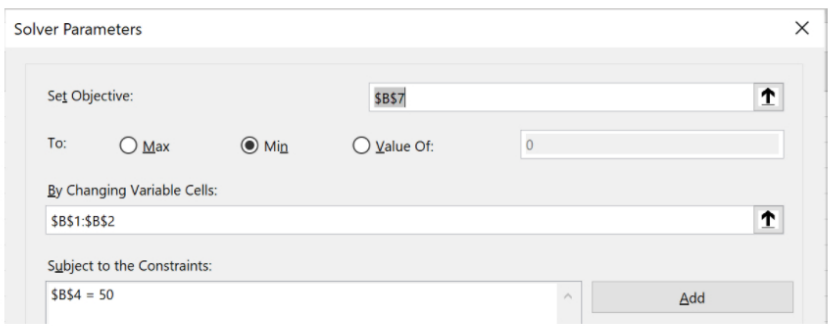
If we need to design a cone that has a total volume of 50 and we need to *minimize* the ratio of surface area to volume (this is just SA divided by V), what is the radius of the cone that satisfies these requirements? Enter your radius rounded to the nearest hundredths place (i.e., format = X.XX).

Correct answer: **2.56**

Explanation: We can set up the following spreadsheet, where cells **B1** (named "**rad**") and **B2** (named "**h**") are initial guesses for radius and height, respectively. The formula in cell **B4** calculates volume of the corresponding cone: **=PI()*rad^2*h/3)**. The formula in cell **B5** calculates the surface area of the corresponding cone: **=PI()*rad^2+PI()*rad*SQRT(rad^2+h^2)**. The formula in cell **B7** is: **=B5/B4**.

	A	B
1	rad	5
2	h	5
3		
4	V	130.8997
5	SA	189.6119
6		
7	SA/V	1.448528

We can use the Solver tool to minimize **SA/V** ratio (cell **B7**) by changing **B1:B2** subject to the constraint that the volume (cell **B4**) = 50:



This results in the following:

	A	B
1	rad	2.564733
2	h	7.25867

3		
4	V	50.00001
5	SA	82.69404
6		
7	SA/V	1.65388

Mark as completed