This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

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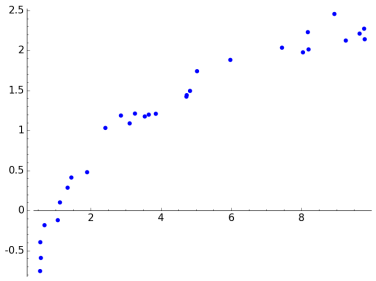
56. Determine the appropriate model for the graph of points below.



The solution is Logarithmic model

A. Exponential model

   For this to be the correct option, we want an extremely slow change early, then a rapid change later.

B. Logarithmic model

   For this to be the correct option, we want a rapid change early, then an extremely slow change later.

C. Linear model

   For this to be the correct option, we need to see a mostly straight line of points.

D. Non-linear Power model

   For this to be the correct option, we need to see a polynomial or rational shape.

E. None of the above

   For this to be the correct option, we want to see no pattern in the points.

General comments: This question is testing if you can associate the models with their graphical representation. If you are having trouble, go back to the corresponding Core module to learn about the specific function you are having trouble recognizing.

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57. Using the scenario below, model the population of bacteria α in terms of the number of minutes, t that pass. Then, choose the correct approximate *(rounded to the nearest minute)* replication rate of bacteria-α. A newly discovered bacteria, α, is being examined in a lab. The lab started with a petri dish of 4 bacteria-α. After 2 hours, the petri dish has 42 bacteria-α. Based on similar bacteria, the lab believes bacteria-α doubles after some undetermined number of minutes. The solution is About 35 minutes

A. About 66 minutes

   This does not solve for the constant correctly.

B. About 35 minutes

   * This is the correct option.

C. About 399 minutes

This does not solve for the constant correctly AND converted incorrectly.

D. About 211 minutes

This solves for the constant correctly but converted incorrectly.

E. None of the above

Please contact the coordinator to discuss why you believe none of the answers above are correct.

General comments: Your model should be $P(t) = P_0(b)^{kt}$, where $P(t)$ is the population at some time t, P_0 is the initial population, and k is the replication rate. Be sure you convert the hours into minutes!

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58. Solve the modeling problem below, if possible. A new virus is spreading throughout the world. There were initially 4 many cases reported, but the number of confirmed cases has quadrupled every 4 days. How long will it be until there are at least 1000 confirmed cases? The solution is About 16 days

A. About 12 days

You modeled the situation with e as the base and did not apply the properties of log correctly.

B. About 23 days

You modeled the situation with e as the base, but solved correctly otherwise.

C. About 16 days

* This is the correct option.

D. About 10 days

You modeled the situation correctly but did not apply the properties of log correctly.

E. There is not enough information to solve the problem.

If you chose this option, please contact the coordinator to discuss why you think this is the case.

General Comments: Set up the model the same as in Module 11M. Then, plug in 1000 and solve for d in your model.

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59. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$. Pringles wants to add 47 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be? The solution is About 14 percent

A. About 14 percent

* This is the correct option.

B. About 21 percent

This corresponds to solving correctly but treating both radius and height as equal contributors to the volume.

C. About 24 percent

This corresponds to treating both radius and height as equal contributors and not solving correctly.

D. About 4 percent

This corresponds to not solving for the increase properly.

E. None of the above

If you chose this, please contact the coordinator to discus how you solved the problem.

General Comments: Remember that when plugging the increases of values in, you need to treat it as that percentage above 100. For example, a 5 percent increase means 105 percent.

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60. Solve the modeling problem below, if possible. In CHM2045L, Brittany created a 28 liter 12 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 9 percent and 27 percent solutions, what was the amount she used of the 9 percent solution? The solution is 23.33

A. 23.33

*This is the correct option.

B. 18.73

This was a random value. If this was not a guess, contact the coordinator to talk about how you got this value.

C. 14.00

This would be correct if Brittany used equal parts of each solution.

D. 4.67

This is the concentration of 27 percent solution.

E. There is not enough information to solve the problem.

You may have chose this if you thought you needed to know how much of the second solution was used in the problem. Remember that the total minus the first solution would give you the second amount used.

General Comments: Build the model exactly as you did in Module 9M. Then, solve for the volume you are looking for.
