1. Solve the modeling problem below, if possible.

   In CHM2045L, Brittany created a 24 liter 13 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 25 percent solutions, what was the amount she used of the 25 percent solution?

   A. 10.79

   B. 6.00

   C. 12.00

   D. 18.00

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

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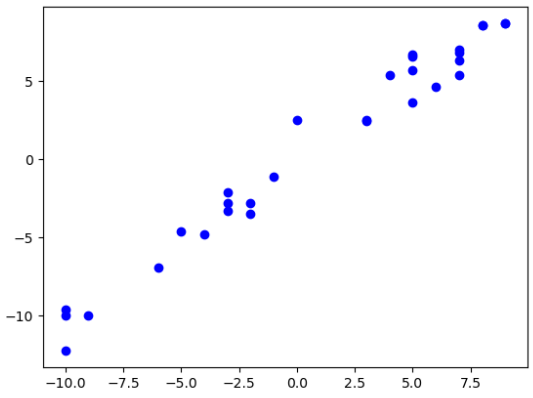
2. Determine the appropriate model for the graph of points below.



   A. Linear model

   B. Logarithmic model

   C. Non-linear Power model

   D. Exponential model

   E. None of the above

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3. Using the scenario below, model the situation using an exponential function and a base of $\frac{1}{2}$. Then, solve for the half-life of the element, rounding to the nearest day.

The half-life of an element is the amount of time it takes for the element to decay to half of its initial starting amount. There is initially 699 grams of element X and after 3 years there is 99 grams remaining.

A. About 1095 days

B. About 365 days

C. About 0 days

D. About 365 days

E. None of the above

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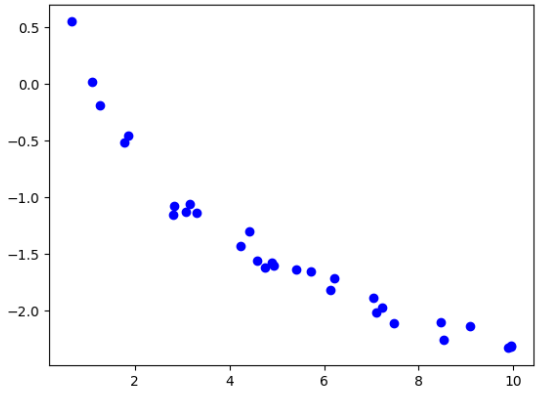
4. Determine the appropriate model for the graph of points below.



A. Logarithmic model

B. Non-linear Power model

C. Linear model

D. Exponential model

E. None of the above

5. For the information below, construct a linear model that describes the total time T spent on the path in terms of the distance of a particular part of the path *if we know that all parts of the path are equal length.*

   A bicyclist is training for a race on a hilly path. Their bike keeps track of their speed at any time, but not the distance traveled. Their speed traveling up a hill is 3 mph, 8 mph when traveling down a hill, and 6 mph when traveling along a flat portion.

   A. $144.000D$

   B. $17.000D$

   C. $0.625D$

   D. The model can be found with the information provided, but isn't options 1-3

   E. The model cannot be found with the information provided.

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6. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

   Pringles wants to add 50 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?

   A. About 25 percent

   B. About 4 percent

   C. About 22 percent

   D. About 14 percent

   E. None of the above

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7. Solve the modeling problem below, if possible.

   A new virus is spreading throughout the world. There were initially 3 many cases reported, but the number of confirmed cases has doubled

every 5 days. How long will it be until there are at least 1000 confirmed cases?

A. About 17 days

B. About 42 days

C. About 20 days

D. About 30 days

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

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8. Solve the modeling problem below, if possible.

A new virus is spreading throughout the world. There were initially 5 many cases reported, but the number of confirmed cases has quadrupled every 2 days. How long will it be until there are at least 10000 confirmed cases?

A. About 16 days

B. About 8 days

C. About 7 days

D. About 11 days

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

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9. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

Pringles wants to add 23 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?

A. About 11 percent

B. About 7 percent

C. About 3 percent

D. About 12 percent

E. None of the above

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10. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 30 liter 17 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 6 percent and 25 percent solutions, what was the amount she used of the 6 percent solution?

A. 17.37

B. 12.63

C. 16.75

D. 15.00

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