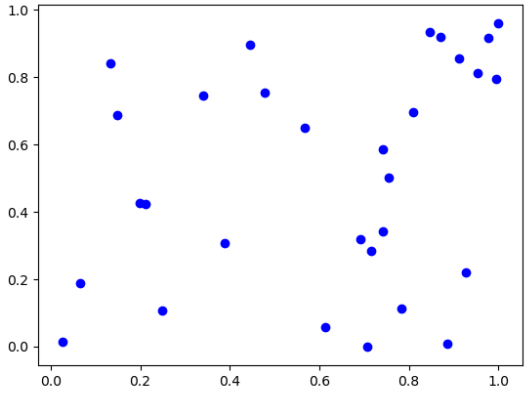
1. Determine the appropriate model for the graph of points below.



A. Logarithmic model

B. Exponential model

C. Non-linear Power model

D. Linear model

E. None of the above

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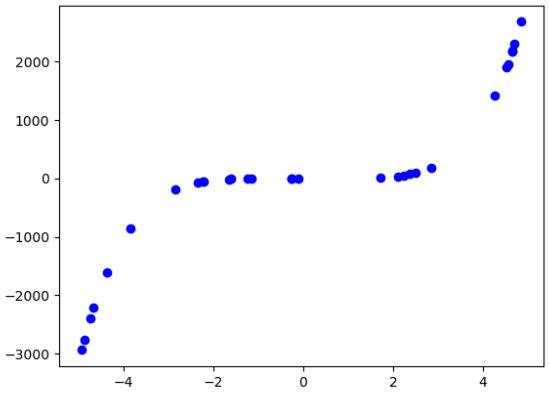
2. Determine the appropriate model for the graph of points below.



A. Non-linear Power model

B. Linear model

C. Exponential model

D. Logarithmic model

E. None of the above

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3. The temperature of an object, T, in a different surrounding temperature T_s will behave according to the formula $T(t) = Ae^{kt} + T_s$, where t is minutes, A is a constant, and k is a constant. Use this formula and the situation below to construct a model that describes the uranium's temperature, T, based on the amount of time t (in minutes) that have passed. Choose the correct constant k from the options below.

Uranium is taken out of the reactor with a temperature of 200° *C and is placed into a* 20° *C bath to cool. After 31 minutes, the uranium has cooled to* 151° *C.*

A. $k = -0.01365$

B. $k = -0.02539$

C. $k = -0.02497$

D. $k = -0.01025$

E. None of the above

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4. Solve the modeling problem below, if possible.

A new virus is spreading throughout the world. There were initially 8 many cases reported, but the number of confirmed cases has quadrupled every 3 days. How long will it be until there are at least 100000 confirmed cases?

A. About 10 days

B. About 12 days

C. About 29 days

D. About 21 days

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

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5. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 30 liter 33 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 20 percent and 48 percent solutions, what was the amount she used of the 20 percent solution?

A. 13.93

B. 15.00

C. 16.07

D. 15.22

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

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6. 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 2 days. How long will it be until there are at least 10000 confirmed cases?

A. About 7 days

B. About 8 days

C. About 12 days

D. About 16 days

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

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

Pringles wants to add 28 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 3 percent

B. About 9 percent

C. About 14 percent

D. About 13 percent

E. None of the above

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

Pringles wants to add 37 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 17 percent

C. About 18 percent

D. About 3 percent

E. None of the above

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9. For the scenario below, model the rate of vibration (cm/s) of the string in terms of the length of the string. Then determine the variation constant k of the model (if possible). The constant should be in terms of cm and s.

The rate of vibration of a string under constant tension varies based on the type of string and the length of the string. The rate of vibration of string ω increases as the cube length of the string decreases. For example, when string ω is 2 mm long, the rate of vibration is 25 cm/s.

A. $k = 0.20$

B. $k = 3.12$

C. $k = 3125.00$

D. $k = 200.00$

E. None of the above.

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10. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 19 liter 35 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 18 percent and 41 percent solutions, what was the amount she used of the 41 percent solution?

A. 14.04

B. 4.96

C. 9.50

D. 11.88

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