1. 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 tripled every 4 days. How long will it be until there are at least 10000 confirmed cases?

   A. About 18 days

   B. About 33 days

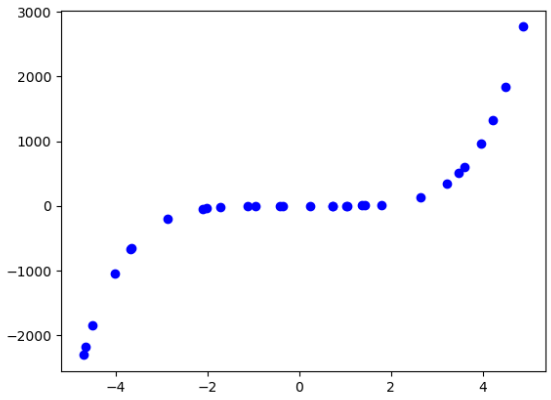
   C. About 30 days

   D. About 17 days

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

---

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



   A. Non-linear Power model

   B. Logarithmic model

   C. Linear model

   D. Exponential model

   E. None of the above

---

3. 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 4 percent

   B. About 14 percent

   C. About 22 percent

   D. About 25 percent

   E. None of the above

---

4. 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 doubled every 1 days. How long will it be until there are at least 100000 confirmed cases?

   A. About 5 days

   B. About 15 days

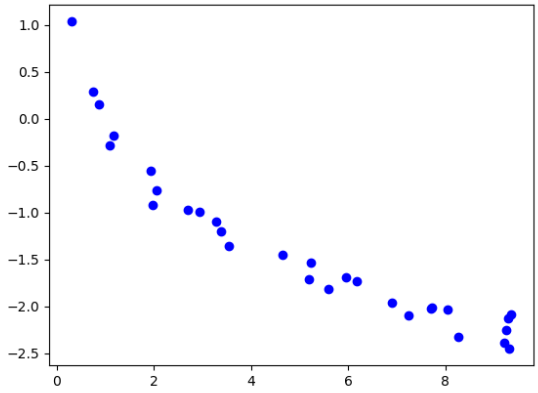
   C. About 6 days

   D. About 11 days

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

---

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



A. Linear model

B. Non-linear Power model

C. Logarithmic model

D. Exponential model

E. None of the above

---

6. 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 190° *C and is placed into a* 16° *C bath to cool. After 10 minutes, the uranium has cooled to* 126° *C.*

   A. $k = -0.07524$

   B. $k = -0.05465$

   C. $k = -0.05465$

   D. $k = -0.07632$

   E. None of the above

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

   Pringles wants to add 34 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 17 percent

   C. About 16 percent

   D. About 10 percent

   E. None of the above

8. For the scenario below, find the variation constant k of the model (if possible).

   In an alternative galaxy, the quartic of the time, T (Earth years), required for a planet to orbit Sun χ decreases as the cube of the distance, d (AUs), that the planet is from Sun χ decreases. For example, when Ea's average distance from Sun χ is 8, it takes 74 Earth days to complete an orbit.

   A. $k = 15353126912.000$

   B. $k = 1.466$

   C. $k = 58567.531$

   D. $k = 4.028$

   E. Unable to compute the constant based on the information given.

9. Solve the modeling problem below, if possible.

   In CHM2045L, Brittany created a 29 liter 28 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 16 percent and 43 percent solutions, what was the amount she used of the 16 percent solution?

A. 14.50

B. 16.11

C. 12.89

D. 12.63

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

---

10. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 28 liter 24 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 14 percent and 36 percent solutions, what was the amount she used of the 36 percent solution?

A. 15.27

B. 14.95

C. 12.73

D. 14.00

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