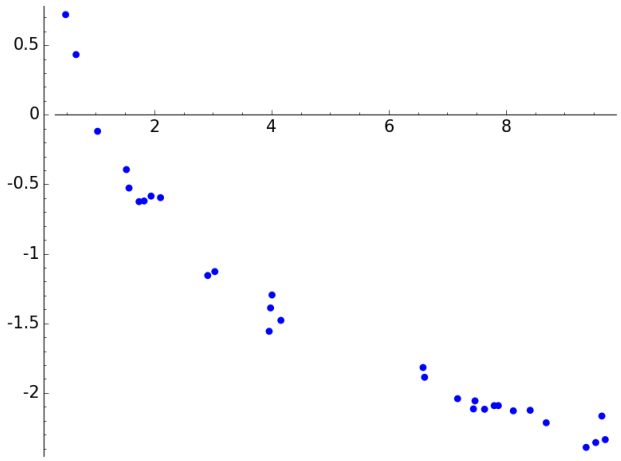
1. Determine the appropriate model for the graph of points below.



A. Non-linear Power model

B. Exponential model

C. Linear model

D. Logarithmic model

E. None of the above

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2. 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 863 grams of element X and after 13 years there is 95 grams remaining.

A. About 365 days

B. About 1825 days

C. About 1460 days

D. About 6205 days

E. None of the above

3. 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 2 bacteria-α. After 2 hours, the petri dish has 44 bacteria-α. Based on similar bacteria, the lab believes bacteria-α doubles after some undetermined number of minutes.

   A. About 42 minutes

   B. About 56 minutes

   C. About 339 minutes

   D. About 254 minutes

   E. None of the above

4. 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 180° *C and is placed into a* 17° *C bath to cool. After 27 minutes, the uranium has cooled to* 133° *C.*

   A. $k = -0.01260$

   B. $k = -0.02843$

   C. $k = -0.01627$

   D. $k = -0.02889$

   E. None of the above

5. A town has an initial population of 100000. The town's population for the next 10 years is provided below. Which type of function would be most appropriate to model the town's population?

Year	1	2	3	4	5	6	7	8	9
Pop.	99920	99840	99680	99360	98720	97440	94880	89760	79520

A. Exponential

B. Non-Linear Power

C. Logarithmic

D. Linear

E. None of the above