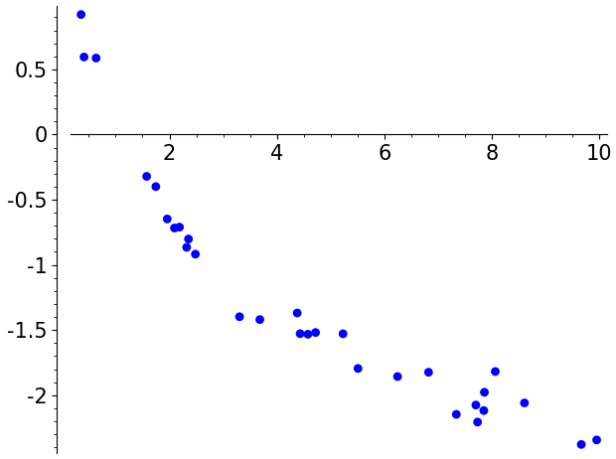
1. Determine the appropriate model for the graph of points below.



A. Logarithmic model

B. Non-linear Power model

C. Exponential model

D. Linear model

E. None of the above

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2. 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 170° *C and is placed into a* 18° *C bath to cool. After 34 minutes, the uranium has cooled to* 119° *C.*

A. $k = -0.02212$

B. $k = -0.01531$

C. $k = -0.01202$

D. $k = -0.02253$

E. None of the above

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3. A town has an initial population of 90000. 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.	89980	89680	88380	84880	77500	64080	41980	8080	0

A. Non-Linear Power

B. Linear

C. Logarithmic

D. Exponential

E. None of the above

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4. 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 643 grams of element X and after 3 years there is 128 grams remaining.

A. About 1095 days

B. About 0 days

C. About 365 days

D. About 365 days

E. None of the above

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5. 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 3 hours, the petri dish has 3058 bacteria-α. Based on similar bacteria, the lab believes bacteria-α quadruples after some undetermined number of minutes.

A. About 112 minutes

B. About 46 minutes

C. About 18 minutes

D. About 279 minutes

E. None of the above
