Instruction

Lesson 4.1.2: Creating and Graphing Exponential Equations in Two Variables

Georgia Standard of Excellence

MGSE9–12.A.CED.2★

Warm-Up 4.1.2 Debrief

1. What is the equation that models the amount of beryllium-11 over time?

   The equation is $y = ab^x$, where y is the final value, a is the initial value, b is how much of the substance remains per time period, and x is the number of time periods.

   y = unknown

   a = 128 grams

   b = 0.5

   The time is 70 seconds, but this must be converted to the number of time periods in order to find the correct value to substitute for x. Therefore, convert 70 seconds into 14-second time periods. 1 time period = 14 seconds.

   $$70 \cancel{\text{ seconds}} \cdot \frac{1 \text{ time period}}{14 \cancel{\text{ seconds}}} = 5 \text{ time periods}$$

   $x = 5$

   Substitute all the known values into the equation.

   $y = ab^x$

   $y = (128)(0.5)^{(5)}$

   The equation that models the amount of beryllium-11 over time is $y = 128(0.5)^5$.

2. How many grams of beryllium-11 does the chemist have left after 70 seconds?

   Apply the order of operations to evaluate the equation from the end of problem 1.

   $y = 128(0.5)^5 = 4$

   There are 4 grams of beryllium-11 left after 70 seconds.

Connection to the Lesson

- Students will create exponential equations.
- Students will deepen their understanding of exponential equations by graphing their solution sets.