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Date: _____

UNIT 4 • MODELING AND ANALYZING EXPONENTIAL FUNCTIONS

Lesson 2: Domain and Range of Exponential Functions

Practice 4.2.1: Domain and Range of Exponential Functions

B

For problems 1–4, determine the range of the given functions and domains.

1. The domain of $f(x) = 5 \cdot 3^x + 2$ is all real numbers. What is the range of $f(x)$?

2. The domain of $g(x) = 12 \cdot 5^x - 8$ is all real numbers. What is the range of $g(x)$?

3. The domain of $h(x) = 5^x + 4$ is $\{-1, 0, 1, 2\}$. What is the range of $h(x)$?

4. The domain of $k(x) = 3^x - 2$ is $\{1, 2, 3, 4\}$. What is the range of $k(x)$?

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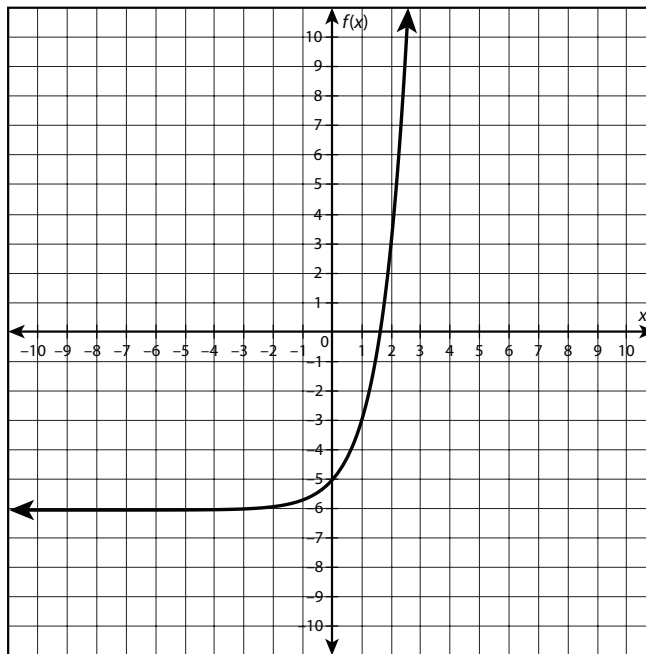
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UNIT 4 • MODELING AND ANALYZING EXPONENTIAL FUNCTIONS

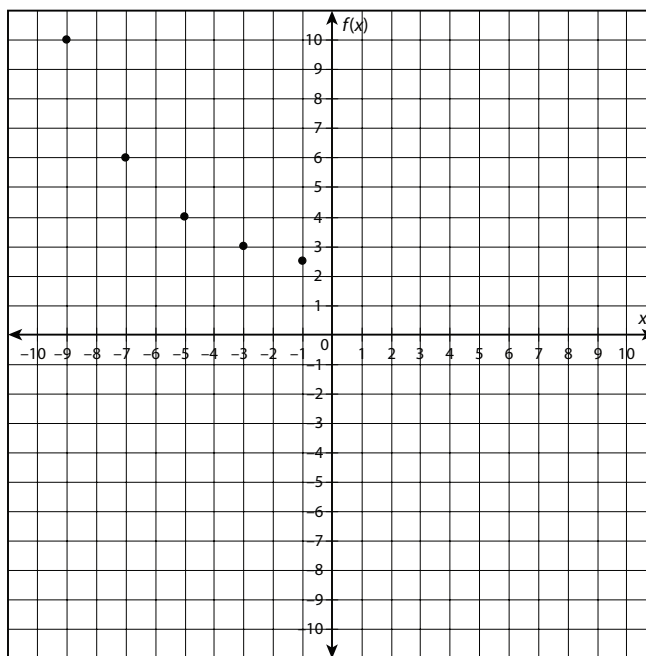
Lesson 2: Domain and Range of Exponential Functions

For problems 5–10, identify the domain and range of the given functions.

5. What are the domain and range of the graphed function?



6. What are the domain and range of the graphed function?



continued

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7. Scientists performed a 5-day study on a species of insect. The population began with 5 insects. The scientists measured the population daily and found it had doubled every day. The function that models the population growth is $f(x) = 5 \cdot 2^x$. What are the domain and range of the function in this situation?
8. An investment promises a return of 6% per year. Shania wants to know how much money she will have if she invests \$3,200 for 2, 5, or 7 years. The investment's growth can be modeled using the exponential function $f(x) = 3200 \cdot 1.06^x$, where x represents the number of years and $f(x)$ represents the return on the investment. What are the domain and range of the function in this situation?
9. There are 8 teams in a soccer tournament. After each round, half the teams are eliminated. This situation can be represented by the function $f(x) = 8 \left(\frac{1}{2}\right)^x$. What are the domain and range of the function in this situation?
10. The half-life of nobelium-259 is 58 minutes. A scientist produced 0.03 milligrams of nobelium-259 for a demonstration. At the end of the demonstration 15 minutes later, only 251 grams remained. The amount of nobelium-259 she had during the demonstration is modeled by the function $f(x) = 0.03 \left(\frac{1}{2}\right)^{\frac{x}{58}}$. What are the domain and range of the function over the 15-minute period?