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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

A

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

1. The domain of $h(x) = 7 \cdot 2^x + 3$ is all real numbers. What is the range of $h(x)$?

2. The domain of $k(x) = 39 \cdot 3^x - 3$ is all real numbers. What is the range of $k(x)$?

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

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

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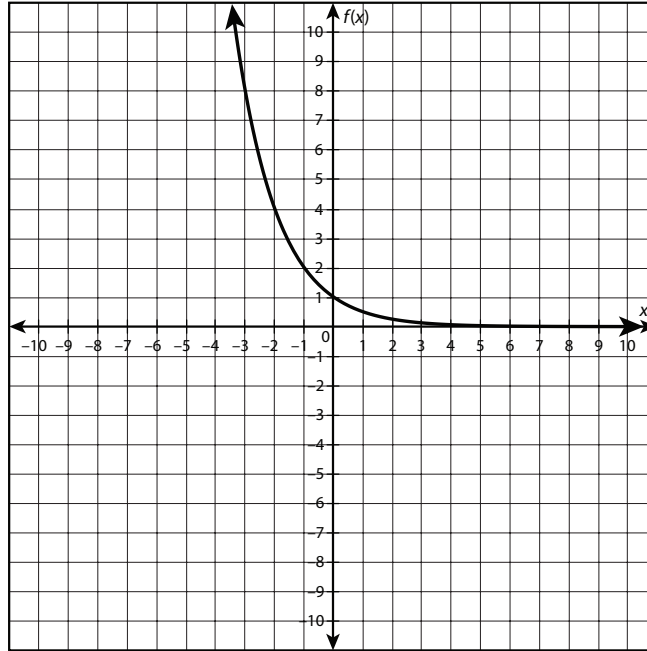
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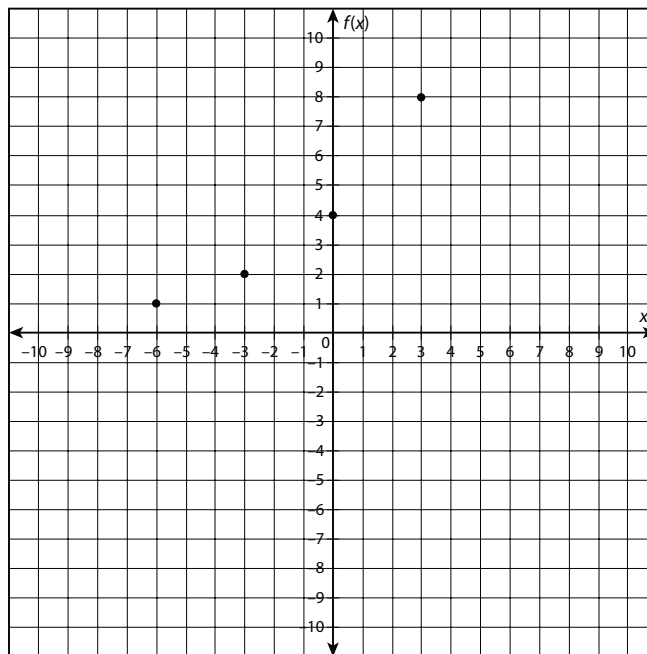
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For problems 5–10, identify the domain and range of the given functions.

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



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



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7. Scientists performed a 12-day study on a species of insect. The population began with 8 insects. The scientists measured the population every 3 days and found it had doubled each time. The function that models the population growth is $f(x) = 8 \cdot 2^{\frac{x}{3}}$. What are the domain and range of the function in this situation?
8. An investment promises a return of 12% per year. Brody wants to know how much money he will have if he invests \$1,000 for 5, 10, or 15 years. The investment's growth can be modeled using the exponential function $f(x) = 1000 \cdot 1.12^x$, 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 32 teams in a basketball tournament. After each round, half the teams are eliminated. This situation can be represented by the function $f(x) = 32 \left(\frac{1}{2}\right)^x$. What are the domain and range of the function in this situation?
10. The half-life of fermium-253 is 3 days. A scientist studying the decay of the element set up a series of instruments to monitor 500 grams of fermium-253. When she measured how much was left 2 days later, only 315 grams remained. The amount of fermium-253 remaining before she measured it is modeled by the function $f(x) = 500 \left(\frac{1}{2}\right)^{\frac{x}{3}}$. What are the domain and range of the function over the 2-day period?