

Exponential Review

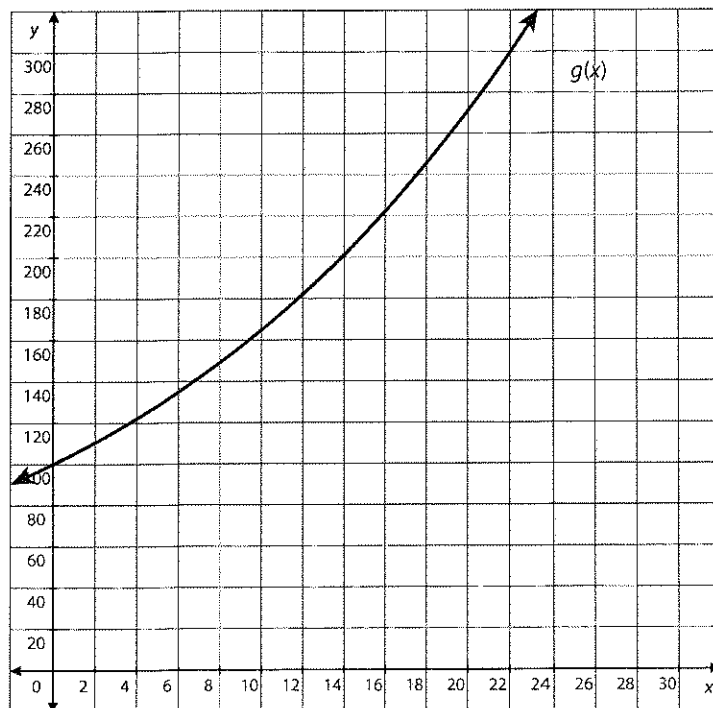
1. Use the table below to determine the rate of change for the interval $[1, 5]$.

Weeks (x)	Amount saved in dollars ($f(x)$)
1	16
2	38
3	60
4	82
5	104

- a. \$17.60 per week
b. \$88 per week
c. \$0.05 per week
d. \$22 per week
2. Describe the end behavior of $y = 2^x$.
- a. growth, with a horizontal asymptote of $y = 1$
b. decay, with a horizontal asymptote of $y = 0$
c. decay, with a horizontal asymptote of $y = 1$
d. growth, with a horizontal asymptote of $y = 0$
3. The population of a small town is 500 people. Based on growth of the population in past years, it is estimated that after 1 year the population will be 600 people. Similarly, it is estimated that after 2 and 3 years, the population will be 720 and 864 people, respectively. Which function describes the relationship between year and town population?
- a. $f(x) = 500 \cdot (1.2)^x$
b. $f(x) = 500 \cdot (1.2)^{x-1}$
c. $f(x) = 100x + 500$
d. $f(x) = 500 \cdot (0.2)^x$
4. What is the rate of change for the function $f(x) = 5(2)^{\frac{x}{4}}$ over the interval $[8, 12]$?
- a. 320
b. 10
c. 5
d. The rate of change cannot be determined.

5. Which of the following statements is true about the functions $f(x)$ and $g(x)$ over the interval $[0, 12]$?

$$f(x) = 200 \left(1 + \frac{0.05}{12} \right)^{12x}$$



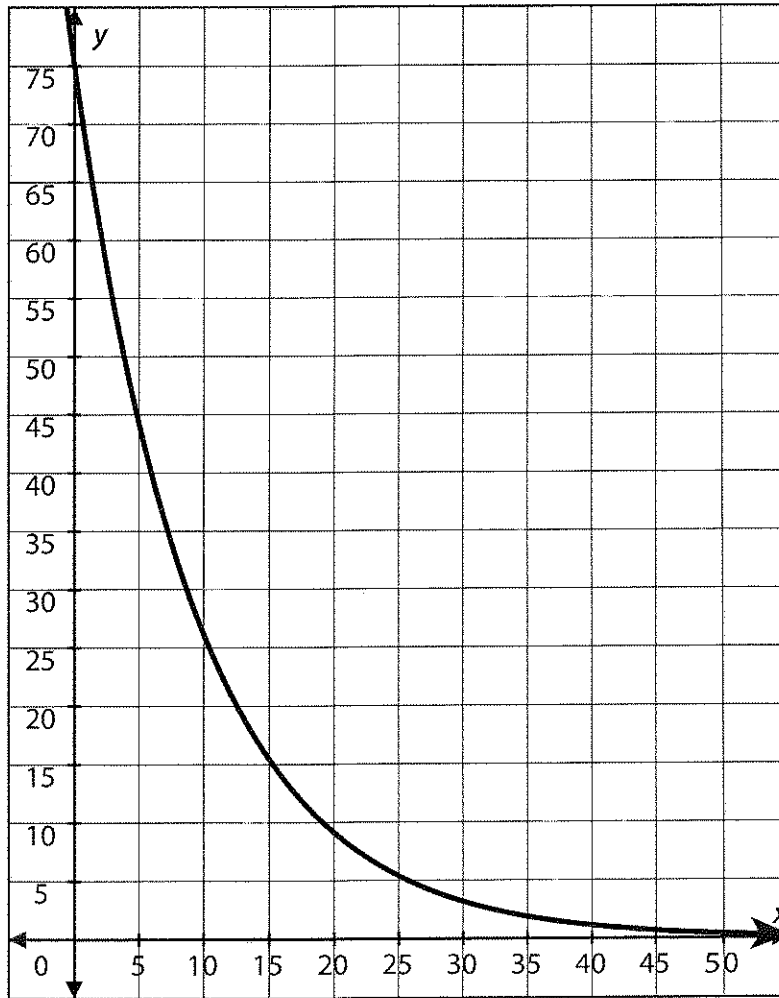
- The rates of change for the functions $f(x)$ and $g(x)$ are equal over the interval $[0, 12]$.
- The rate of change for the function $f(x)$ is greater than the rate of change for the function $g(x)$ over the interval $[0, 12]$.
- The rate of change for the function $f(x)$ is less than the rate of change for the function $g(x)$.
- The rate of change for the functions cannot be determined.

6. Which function represents the relationship between x and y shown in the table below?

x	y
0	3
1	33
2	363
3	3993

- $f(x) = 3^x$
- $f(x) = 11 \cdot 3^x$
- $f(x) = 11^x$
- $f(x) = 3 \cdot 11^x$

7. Use the graph below to determine the approximate rate of change for the interval $[0, 30]$.



- a. -2.4
- b. 2.4
- c. -0.42
- d. The rate of change cannot be determined.

8. Identify the parameters in the function $f(x) = 2^x + 3$.

- a. The growth factor is 2 and the vertical shift is 3.
- b. x and $f(x)$
- c. The growth factor is 3 and the vertical shift is 2.
- d. 0 and 4

9. Which explicit equation represents the pattern in the table below?

x	$f(x)$
1	-5
2	-35
3	-245
4	-1715

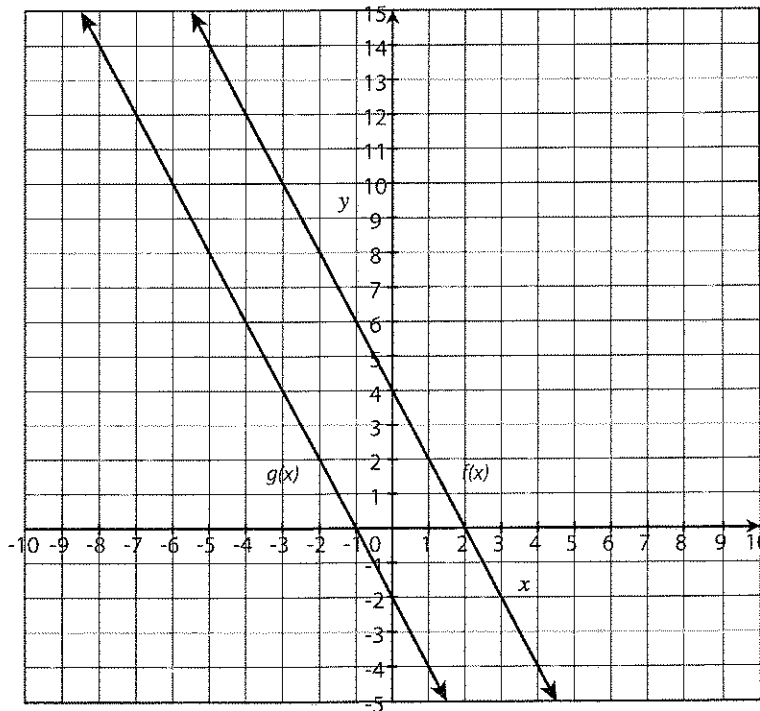
a. $f(x) = (-5)^{x-1}$

c. $f(x) = (5) \cdot (-7)^{x-1}$

b. $f(x) = -7 \cdot (5)^{x-1}$

d. $f(x) = (-5) \cdot 7^{x-1}$

10. Given the graphs of $f(x)$ and $g(x)$ below, which is the function rule for $g(x)$ in terms of $f(x)$?



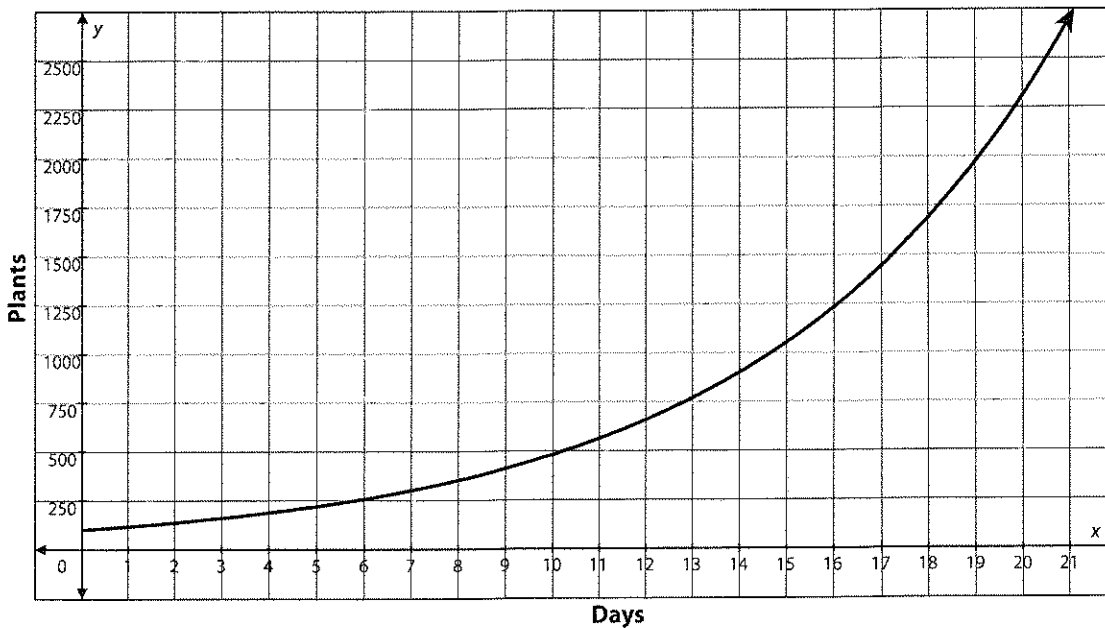
a. $g(x) = f(x) + 6$

c. $g(x) = f(x) - 2$

b. $g(x) = f(x) + 4$

d. $g(x) = f(x) - 6$

12. When a plant is introduced to a new outdoor environment, it can be difficult to tell whether the plant will adapt to the new conditions. Sometimes the plant will adapt too well and begin to overtake other nearby plants. When this happens, the rate at which the plant reproduces appears to explode. The graph below shows the population of a particular plant after it was introduced to a new environment.



- What are the key features of this function and what do they mean in terms of this scenario? Be sure to include the intercepts, whether the function is increasing or decreasing, and whether the function is positive or negative; also, include any relative minimums and maximums as well as any asymptotes.
- What is the domain of this function?
- How does the rate of change vary over time?