

## Lesson 12 Practice Problems

1. Here are equations defining three exponential functions  $f$ ,  $g$ , and  $h$ .

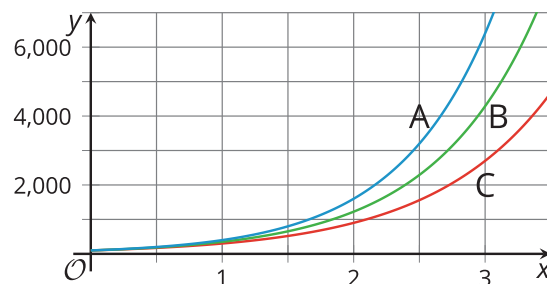
$$f(x) = 100 \cdot 3^x$$

$$g(x) = 100 \cdot (3.5)^x$$

$$h(x) = 100 \cdot 4^x$$

a. Which of these functions grows the least quickly? Which one grows the most quickly? Explain how you know.

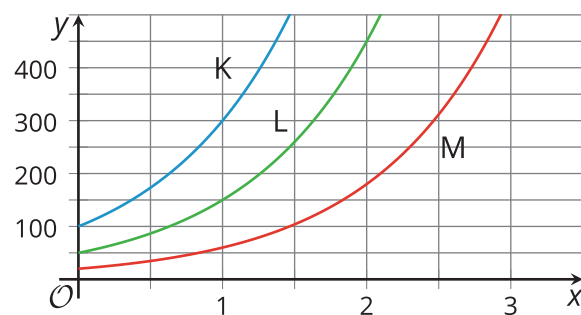
b. The three given graphs represent  $f$ ,  $g$ , and  $h$ . Which graph corresponds to each function?



c. Why do all three graphs share the same intersection point with the vertical axis?

2. Here are graphs of three exponential equations.

Match each equation with its graph.



A.  $y = 20 \cdot 3^x$

B.  $y = 50 \cdot 3^x$

C.  $y = 100 \cdot 3^x$

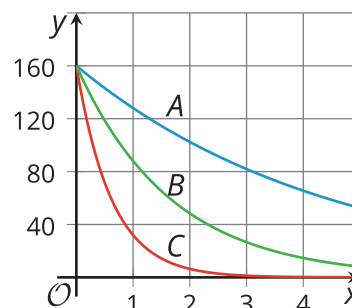
1. K

2. L

3. M

3. The function  $f$  is given by  $f(x) = 160 \cdot \left(\frac{4}{5}\right)^x$  and the function  $g$  is given by  $g(x) = 160 \cdot \left(\frac{1}{5}\right)^x$ . The graph of  $f$  is labeled  $A$  and the graph of  $g$  is labeled  $C$ .

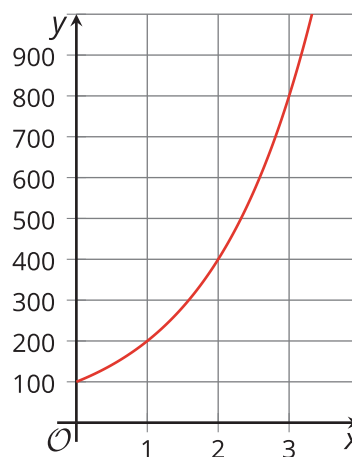
If  $B$  is the graph of  $h$  and  $h$  is defined by  $h(x) = a \cdot b^x$ , what can you say about  $a$  and  $b$ ? Explain your reasoning.



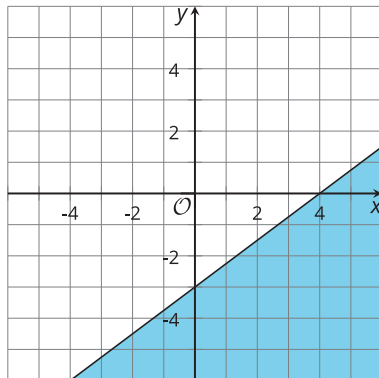
4. Here is a graph of  $y = 100 \cdot 2^x$ .

On the same coordinate plane:

- Sketch a graph of  $y = 50 \cdot 2^x$  and label it  $A$ .
- Sketch a graph of  $y = 200 \cdot 2^x$  and label it  $B$ .



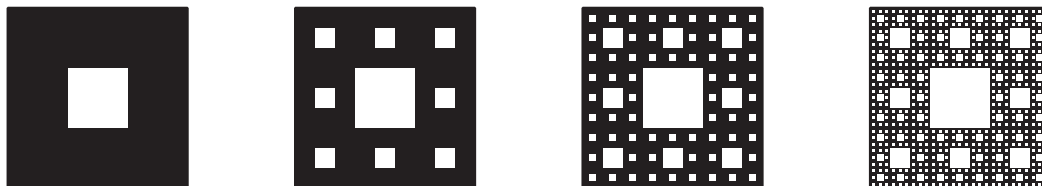
5. Choose the inequality whose solution region is represented by this graph.



- A.  $3x - 4y > 12$
- B.  $3x - 4y \geq 12$
- C.  $3x - 4y < 12$
- D.  $3x - 4y \leq 12$

(From Unit 2, Lesson 21.)

6. *Technology required.* Start with a square with area 1 square unit (not shown). Subdivide it into 9 squares of equal area and remove the middle one to get the first figure shown.

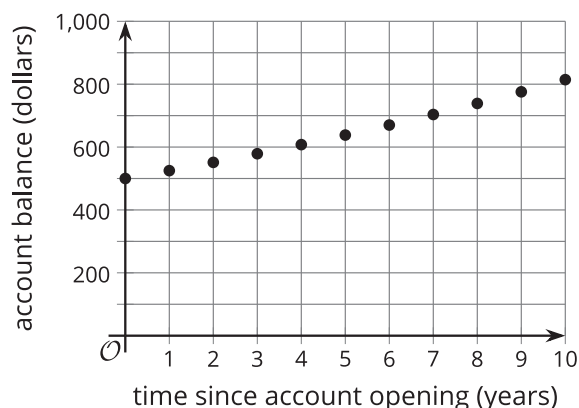


- What is the area of the first figure shown?
- Take the remaining 8 squares, subdivide each into 9 equal squares, and remove the middle one from each. What is the area of the figure now?
- Continue the process and find the area for stages 3 and 4.
- Write an equation representing the area  $A$  at stage  $n$ .
- Use technology to graph your equation.
- Use your graph to find the first stage when the area is first less than  $\frac{1}{2}$  square unit.

(From Unit 5, Lesson 5.)

7. The equation  $b = 500 \cdot (1.05)^t$  gives the balance of a bank account  $t$  years since the account was opened. The graph shows the annual account balance for 10 years.

- What is the average annual rate of change for the bank account?
- Is the average rate of change a good measure of how the bank account varies? Explain your reasoning.



(From Unit 5, Lesson 10.)