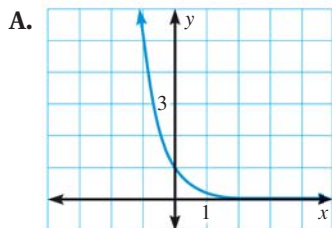
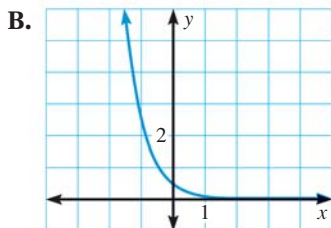


**MATCHING** Match the function with its graph.

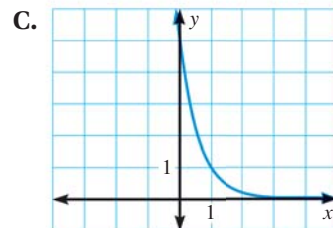
32.  $y = (0.2)^x$



33.  $y = 5(0.2)^x$



34.  $y = \frac{1}{2}(0.2)^x$



35. **POPULATION** A population of 90,000 decreases by 2.5% per year. Identify the initial amount, the decay factor, and the decay rate. Then write a function that models the population over time.

36. **TAKS REASONING** What is the decay rate of the function  $y = 4(0.97)^t$ ?

- (A) 4                      (B) 0.97                      (C) 0.3                      (D) 0.03

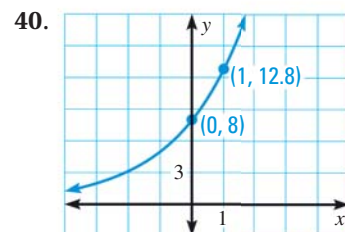
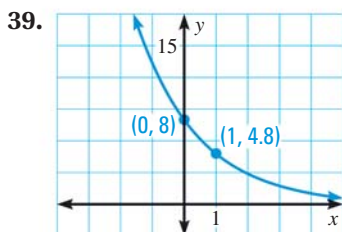
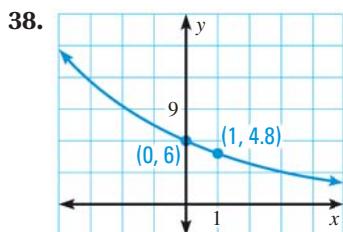
37. **ERROR ANALYSIS** In 2004 a person purchased a car for \$25,000. The value of the car decreased by 14% annually. Describe and correct the error in writing a function that models the value of the car since 2004.

$$y = a(1 - r)^t$$

$$= 25,000(0.14)^t$$

**EXAMPLE 4**  
on p. 533  
for Exs. 38–40

**RECOGNIZING EXPONENTIAL MODELS** Tell whether the graph represents exponential growth or exponential decay. Then write a rule for the function.



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41. **REASONING** Without graphing, explain how the graphs of the given functions are related to the graph of  $f(x) = (0.5)^x$ .

- a.  $m(x) = \frac{1}{3} \cdot (0.5)^x$                       b.  $n(x) = -4 \cdot (0.5)^x$                       c.  $p(x) = (0.5)^x + 1$

**CHALLENGE** Write an exponential function of the form  $y = ab^x$  whose graph passes through the given points.

42.  $(0, 1), (2, \frac{1}{4})$                       43.  $(1, 20), (2, 4)$                       44.  $(1, \frac{3}{2}), (2, \frac{3}{4})$

45. **WRITING** The initial amount of a quantity is  $a$  units and the quantity is decaying at a rate of  $r$  (a percent per time period). Show that the amount of the quantity after one time period is  $a(1 - r)$ . Explain how you found your answer.

46. **CHALLENGE** Compare the graph of the function  $f(x) = 4^{x-2}$  with the graph of the function  $g(x) = \frac{1}{16} \cdot 4^x$ . Use properties of exponents to explain your observation.