

## 7.6

## Solve Exponential and Logarithmic Equations

**EXAMPLE**

Solve the equation.

- a.  $7^x = 12$   
 $\log_7 7^x = \log_7 12$   
 $x = \log_7 12$   
 $x = \frac{\log 12}{\log 7} \approx 1.277$
- b.  $\log_2 (3x - 7) = 5$   
 $2^{\log_2 (3x - 7)} = 2^5$   
 $3x - 7 = 32$   
 $x = 13$

**EXAMPLES**  
2, 5, and 6on pp. 516–518  
for Exs. 32–34**EXERCISES**

Solve the equation. Check for extraneous solutions.

32.  $5^x = 32$
33.  $\log_3 (2x - 5) = 2$
34.  $\ln x + \ln (x + 2) = 3$

## 7.7

## Write and Apply Exponential and Power Functions pp. 529–536

**EXAMPLE**Write an exponential function  $y = ab^x$  whose graph passes through  $(-1, 2)$  and  $(3, 32)$ .Substitute the coordinates of the two given points into  $y = ab^x$ .

$$2 = ab^{-1} \quad \text{Substitute 2 for } y \text{ and } -1 \text{ for } x.$$

$$32 = ab^3 \quad \text{Substitute 32 for } y \text{ and } 3 \text{ for } x.$$

Solve for  $a$  in the first equation to obtain  $a = 2b$ , and substitute this expression for  $a$  in the second equation.

$$32 = (2b)b^3 \quad \text{Substitute } 2b \text{ for } a \text{ in second equation.}$$

$$32 = 2b^4 \quad \text{Product of powers property}$$

$$16 = b^4 \quad \text{Divide each side by 2.}$$

$$2 = b \quad \text{Take the positive fourth root because } b > 0.$$

Because  $b = 2$ , it follows that  $a = 2(2) = 4$ . So,  $y = 4 \cdot 2^x$ .**EXAMPLES**  
1 and 5on pp. 529–532  
for Exs. 35–38**EXERCISES**Write an exponential function  $y = ab^x$  whose graph passes through the points.

35.  $(3, 8)$ ,  $(5, 2)$
36.  $(-2, 2)$ ,  $(1, 0.25)$
37.  $(2, 9)$ ,  $(4, 324)$

38. **SPORTING GOODS** A store begins selling a new type of basketball shoe. The table shows sales of the shoe over time. Find a power model for the data.

| Week, $x$       | 1  | 2  | 3  | 4  | 5  | 6   |
|-----------------|----|----|----|----|----|-----|
| Pairs sold, $y$ | 28 | 47 | 64 | 79 | 94 | 107 |