7.6 Solve Exponential and Logarithmic Equations
pp. 515–522

EXAMPLE

Solve the equation.

a. $7^x = 12$

$\log_7 7^x = \log_7 12$

$x = \log_7 12$

$x = \dfrac{\log 12}{\log 7} \approx 1.277$

b. $\log_2 (3x - 7) = 5$

$2^{\log_2 (3x - 7)} = 2^5$

$3x - 7 = 32$

$x = 13$

EXAMPLES 2, 5, and 6 on 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 $(3, 32)$.

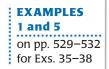Substitute the coordinates of the two given points into $y = ab^x$.

$2 = ab^{-1}$ **Substitute 2 for y and −1 for x.**

$32 = ab^3$ **Substitute 32 for y and 3 for x.**

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

$32 = (2b)b^3$ **Substitute 2b for a in second equation.**

$32 = 2b^4$ **Product of powers property**

$16 = b^4$ **Divide each side by 2.**

$2 = b$ **Take the positive fourth root because b > 0.**

Because $b = 2$, it follows that $a = 2(2) = 4$. So, $y = 4 \cdot 2^x$.

EXERCISES

Write an exponential function $y = ab^x$ whose graph passes through the points.

EXAMPLES 1 and 5 on pp. 529–532 for Exs. 35–38

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