

p. 32-33 Solving Log Equations by Rewriting 7.4

Fill in the Blanks

p. 33

1.  $2^{\boxed{5}} = 32$

2.  $3^{\boxed{-2}} = \frac{1}{9}$

3.  $28^{\boxed{0}} = 1$

4.  $10^{\boxed{3}} = 1,000$

**Exponential equations** can be rewritten as **logarithm equations**

What is a logarithm?

The exponent to which a fixed number (base) must be raised to produce a given number

**Exponential Form**

$$b^x = y$$

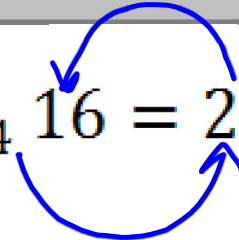
**Logarithmic Form**

$$\log_b y = x$$

Ex:  $4^2 = 16$



$\log_4 16 = 2$



**Exponential Form**

$$b^x = y$$

**Logarithmic Form**

$$\log_b y = x$$

$$4^2 = 16 \longleftrightarrow \log_4 16 = 2$$

**Rewrite in exponential form.**

1)  $\log_5 625 = 4$

$$\underline{5^4 = 625}$$

2)  $\log_2 \frac{1}{8} = -3$

$$\underline{2^{-3} = \frac{1}{8}}$$

3)  $\log_5 125 = 3$

$$\underline{5^3 = 125}$$

**Rewrite in logarithmic form.**

4)  $10^4 = 10,000$

$$\underline{\log_{10} 10000 = 4}$$

5)  $6^{-2} = \frac{1}{36}$

$$\underline{\log_6 \frac{1}{36} = -2}$$

Solve each equation by rewriting to exponential form. p. 32  
 Note: your equation must first be in logarithm form.

$$1) \log_3 x = 5$$

$$3^5 = x$$

$$\boxed{243 = x}$$

$$3) \log_5(x + 10) = 2$$

$$5^2 = x + 10$$

$$25 = x + 10$$

$$\begin{array}{r} -10 \\ -10 \end{array} \quad \begin{array}{r} -10 \\ -10 \end{array}$$

$$\boxed{15 = x}$$

$$2) \frac{4 \log_2 x = -12}{4 \quad 4}$$

$$\log_2 x = -3$$

$$2^{-3} = x$$

$$\boxed{x = \frac{1}{8}}$$

$$4) \frac{\cancel{3} \log_{10}(x - 400) = 9}{\cancel{3} \quad 3}$$

$$\log_{10}(x - 400) = 3$$

$$10^3 = x - 400$$

$$1000 = x - 400$$

$$+400$$

$$\boxed{1400 = x}$$

$$5) \log_6(2x - 1) = 2$$

$$6^2 = 2x - 1$$

$$\begin{array}{r} 36 = 2x - 1 \\ +1 \qquad +1 \end{array}$$

$$\frac{37}{2} = \frac{2x}{2}$$

$$\boxed{18.5 = x}$$

$$6) \frac{4 \log_2(2x) = 16}{4 \quad 4}$$

$$\log_2(2x) = 4$$

$$2^4 = 2x$$

$$\frac{16}{2} = \frac{2x}{2}$$

$$\boxed{8 = x}$$

## Homework: Rewriting and Simple Solving