p. 32-33 Solving Log Equations by Rewriting 7.4

p. 33

Fill in the Blanks

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	**Logarithmic Form**
$b^x = y$	$\log_b y = x$

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

Exponential Form

$$b^x = y$$

Logarithmic Form

$$\log_b y = x$$

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

Rewrite in exponential form.

1) $\log_5 625 = 4$

$5^4 = 625$

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

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

3) $\log_5 125 = 3$

$5^3 = 125$

Rewrite in logarithmic form.

4) $10^4 = 10{,}000$

$\log_{10} 10000 = 4$

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

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

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

1) $\log_3 x = 5$

$3^5 = x$

$243 = x$

2) $4\log_2 x = -12$

$\frac{4\log_2 x}{4} = \frac{-12}{4}$

$\log_2 x = -3$

$2^{-3} = x$

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

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

$5^2 = x + 10$

$25 = x + 10$

$-10 \quad -10$

$15 = x$

4) ~~3~~$\log_{10}(x-400) = 9$

$\frac{\log_{10}(x-400)}{1} = \frac{9}{3}$

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

$10^3 = x - 400$

$1000 = x - 400$

$+400 \quad +400$

$1400 = x$

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

$6^2=2x-1$

$36=2x-1$

$+1 \quad +1$

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

$18.5=x$

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

$\log_2(2x)=4$

$2^4=2x$

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

$8=x$

Homework: Rewriting and Simple Solving