9.2 - I will convert exponential expressions to logarithm form and vice versa

exponential equation

$$b^{p} = n$$

power

base

logarithm equation

$$\log_b n = p$$

log #

base

power

$$b \neq 1, b > 0$$

must be positive

$$n > 0$$

must be positive

Convert from exponential equation to log equation $b^p = n \rightarrow \log_b n = p$

$5^2 = 25$

$\log_5 25 = 2$

$5^{-3} = 1/125$

$\log_5 \frac{1}{125} = -3$

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

$\log_3 \frac{1}{9} = -2$

$4^{1/2} = 2$

$\log_4 2 = 1/2$

$6^0 = 1$

$\log_6 1 = 0$

$3^2 = 9$

$\log_3 9 = 2$

$\log_b n = p \rightarrow b^p = n$

Convert from log equation to exponential equation

$\log_4 64 = 3$

$4^3 = 64$

$\log_4 16 = 2$

$4^2 = 16$

$\log_8 \frac{1}{64} = -2$

$8^{-2} = \frac{1}{64}$

$\log_6(1/216) = -3$

$6^{-3} = \frac{1}{216}$

$\log_{25} 5 = \frac{1}{2}$

$25^{1/2} = 5$

evaluate

must have same base

$\log_9 27 = X$

$9^X = 27$

$3^{2X} = 3^3$

$\frac{2X}{2} = \frac{3}{2}$

$X = 3/2$

check:

$\log_9 27 = 3/2$

$9^{3/2} = 27$

$\sqrt{9^3} = 27$

$\sqrt{3^6} = 27$

$3^3 = 27$

$27 = 27$ ✓

$\log_4 64 = X$

$4^X = 64$

$2^{2X} = 2^6$

$2X = 6$

$X = 3$

$\log_2 64 = X$

$2^X = 64$

$2^X = 2^6$

$X = 6$

$\log_6 6^9 = X$

$6^X = 6^9$

$X = 9$

$\log_5 25 = X$

$5^X = 25$

$5^X = 5^2$

$X = 2$

$\log_{36} 6 = X$

$36^X = 6$

$6^{2X} = 6^1$

$2X = 1$

$X = 1/2$

$\log_6 1 = X$

$6^X = 1$

$6^X = 6^0$

$X = 0$

$\log_{10} 1 = X$

$10^X = 1$

$X = 0$

$\log_3(\frac{1}{27}) = X$

$3^X = \frac{1}{27}$

$3^X = \frac{1}{3^3}$

$3^X = 3^{-3}$

$X = -3$

$\log_4 8 = X$

$4^X = 8$

$2^{2X} = 2^3$

$2X = 3$

$X = 3/2$

$\log_8 1 = X$

$8^X = 1$

$X = 0$

Solve

$\log_{16} x = \frac{3}{2}$

$16^{3/2} = X$

$\sqrt{16^3} = X$

$\sqrt{2^{4(3)}} = X$

$\sqrt{2^{12}} = X$

$2^6 = X$

$64 = X$

$\log_a \frac{1}{8} = -3$

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

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

$a^{-3} = 2^{-3}$ When exponents same, bases =

$a = 2$

$\log_2 32 = 3x$

$2^{3x} = 32$

$2^{3x} = 2^5$

$3x = 5$

$x = 5/3$

$\log_7 x = 5$

$7^5 = x$

$16,807 = x$

$\log_4 x = 3/2$

$4^{3/2} = x$

$\sqrt{4^3} = x$

$\sqrt{2^6} = x$

$2^3 = x$

$8 = x$

$\log_y 16 = -4$

$y^{-4} = 16$

$(y^4)\frac{1}{y^4} = 16(y^4)$

$\frac{1}{16} = \frac{16y^4}{16}$

$\sqrt[4]{\frac{1}{16}} = \sqrt[4]{y^4}$

$\frac{1}{2} = y$

$\log_{49} n = 1/2$

$49^{1/2} = n$

$\sqrt{49} = n$

$7 = n$

$\log_{4x} 64 = 2$

$(4x)^2 = 64$

$\frac{16x^2}{16} = \frac{64}{16}$

$\sqrt{x^2} = \sqrt{4}$

~~$x = \pm 2$~~ $x = 2$

must be pos. 2 b/c no neg base #

$\log_7(x^2 + 9) = 2$

$7^2 = x^2 + 9$

$49 = x^2 + 9$

$-9 \quad -9$

$\sqrt{40} = \sqrt{x^2}$

$\pm 2\sqrt{10} = x$

pg. 536 ~~#22-38even, 48-56 even (check 2)~~
change <,> to =

#22, 26, 30, 34, 38,
48, 50, 52, 56