

Math 98 Worksheet #10 Solutions

1. Solve the following equations.

$$(a) 3^{2x} = 81 \Rightarrow 3^{2x} = 3^4 \Rightarrow 2x = 4 \Rightarrow x = 2$$

$$(b) 5^x = \frac{1}{25} \Rightarrow 5^x = 5^{-2} \Rightarrow x = -2$$

$$(c) 9^x = 27^{x+\frac{1}{3}} \Rightarrow (3^2)^x = (3^3)^{x+\frac{1}{3}} \Rightarrow 3^{2x} = 3^{3x+1} \\ \Rightarrow 2x = 3x + 1 \\ \Rightarrow x = -1$$

$$(d) \log_x 16 = 2 \Rightarrow x^2 = 16 \Rightarrow x = 4 \quad (\text{Note: } x \text{ cannot be } -4 \text{ since the base of a} \\ \text{log must be positive.})$$

$$(e) \log_4 x = 3 \Rightarrow 4^3 = x \Rightarrow x = 64$$

$$(f) \log_7 49 = x \Rightarrow 7^x = 49 \Rightarrow x = 2$$

2. Evaluate the following logarithms.

$$(a) \log_2 2 = 1 \quad \text{since } \log_a a = 1 \text{ for any positive number } a \text{ (} a \neq 1 \text{)}.$$

$$(b) \log_{10} 100 = 2 \quad \text{since } 10^2 = 100.$$

$$(c) \log_9 3 = \frac{1}{2} \quad \text{since } 9^{1/2} = 3.$$

3. Fill in the following table.

Exponential Form	Logarithmic Form
$5^2 = 25$	$\log_5 25 = 2$
$3^1 = 3$	$\log_3 3 = 1$
$4^{-2} = \frac{1}{16}$	$\log_4 \frac{1}{16} = -2$
$2^3 = 8$	$\log_2 8 = 3$