PreCalculus12 Date:_____

Unit 8: Logarithmic Functions
8.4 Logarithms & Exponential Equations

Part I: Use logarithms to solve for exponents

If $L = R$ then $\log_C L = \log_c R$

Ex. Solve to the nearest hundredth:

a) $2^x = 5$ b) $8(3^{2x}) = 568$ c) $3^{x+2} = 5^{2x-3}$

Ex. A city's population doubles every 8 years. How long, to the nearest year, will it take for the population to grow from 25,000 to 1 million people?

$F = Ir^{t/n}$

Ex. Evaluate to the nearest hundredth:

$\log_5 782$

The previous example demonstrates the Change of Base Rule:

$$\log_c a = \frac{\log_x a}{\log_x c}$$

x is a base of your choosing

*also use to graph non base 10 logs with calc

Ex. Graph $\log_3(x-1)+2$ with your calculator & sketch below.

Ex. Evaluate to the nearest tenth:

$\log_3 16$

Ex. Evaluate without a calculator:

$\log_4 32$

Part II: Solving logarithmic equations

Case I Equations with all log terms **If $\log_c x = \log_c y$ then $x = y$**

Ex. Solve:

a) $\log_3(3x + 1) = \log_3 2 + \log_3 8$

b) $\log x = \log 4 - \log(x - 3)$

Case II Equations with log terms and constant terms **If $\log_c x = y$ then $c^y = x$**

Ex. Solve:

a) $\log_8(x + 3) - 1 = -\log_8(x + 1)$

b) $\log_2(3 - x) + \log_2(1 - x) = 3$

Practice: pg. 412/ # 1 – 13, 15 – 18, 20 – 22