MTH-PT Trigonometry Session 6 2/12

$17^{10v-4} - 8 = 71$

$+8 \quad +8$

$\log 17^{10v-4} = \log 79$

$\log 17^{10v-4} = \log 79$

$(10v-4)(\log 17) = \log 79$

$\frac{(10v-4)(\log 17)}{\log 17} = \frac{\log 79}{\log 17}$

$10v - 4 = \frac{\log 79}{\log 17}$

$+4 \quad +4$

$\frac{10v}{10} = \frac{\frac{\log 79}{\log 17} + 4}{10}$

$v = \frac{\frac{\log 79}{\log 17} + 4}{10}$

$= \boxed{0.554}$

$11^{2-7x} - 6 = 54$

$+6 \quad +6$

$\log 11^{2-7x} = \log 60$

$(2-7x)(\log 11) = \log 60$

$\frac{(2-7x)(\log 11)}{\log 11} = \frac{\log 60}{\log 11}$

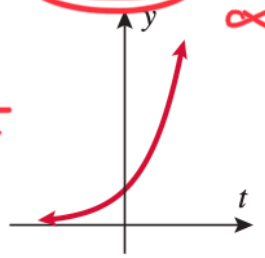
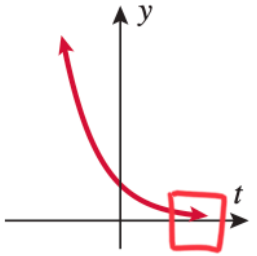
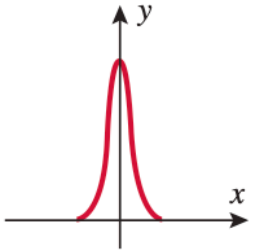
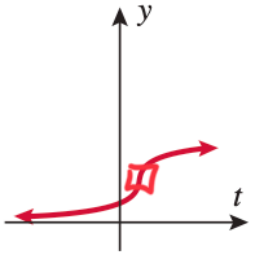
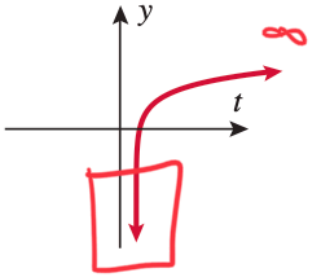
$2 - 7x = \frac{\log 60}{\log 11}$

$-2 \quad -2$

$-7x = \frac{\log 60}{\log 11} - 2$

$\frac{-7x}{-7} = \frac{\frac{\log 60}{\log 11} - 2}{-7}$

$\boxed{x = \frac{\frac{\log 60}{\log 11} - 2}{-7}}$

Name	Model	Graph	Applications
Exponential growth	$f(t) = ce^{kt}$ $k > 0$		World populations, bacteria growth, appreciation, global spread of the HIV virus
Exponential decay	$f(t) = ce^{-kt}$ $k > 0$		Radioactive decay, carbon dating, depreciation
Gaussian (normal) distribution	$f(x) = ce^{-(x-a)^2/k}$		Bell curve (grade distribution), life expectancy, height/weight charts, intensity of a laser beam, IQ tests
Logistic growth	$f(t) = \dfrac{a}{1 + ce^{-kt}}$		Conservation biology, learning curve, spread of virus on an island, carrying capacity
Logarithmic	$f(t) = a + c \log t$ $f(t) = a + c \ln t$		Population of species, anesthesia wearing off, time to pay off credit cards

Pre-Calculus Chapter 3 Pre-Test

1.) (2 pts each, 6 pts total) Evaluate exactly. Do not use decimals.

a) 7^{-2} ← bottom

$= \boxed{\frac{1}{7^2}} = \frac{1}{49}$

b) $8^{2/3}$ $8^{\frac{2}{3}}$ ← exponent, ← root

$\left(\sqrt[3]{8}\right)^2 = (2)^2 = \boxed{4}$

c) $(1/4)^{5/2}$ $\left(\frac{1}{4}\right)^{\frac{5}{2}}$

$\left(\sqrt{\frac{1}{4}}\right)^5 = \left(\frac{1}{2}\right)^5 = \frac{1^5}{2^5} = \boxed{\frac{1}{32}}$

2.) (2 pts each, 4 pts total) Evaluate each function.

a) $f(x) = 4^x$, $x = 3$

$4^3 = \boxed{64}$

b) $g(x) = 10^{x+4}$, $x = -2$

$10^{-2+4} = 10^2 = \boxed{100}$

10^2 ← $10 \cdot 10$

3.) (5 pts each, 10 pts total) Graph each function. Identify at least two points on the line (please use points indicated in class).

a) $y = 3^{x+2}$

$y = 3^x$

$x+2=0$

$y = 3^0 = 1$ left 2 $x+2=1$

$y = 3^1 = 3$

$x+2=0$
$-2\ -2$
$x=-2$ (-2, 1)

asymptote

$x+2=1$ (-1, 3)
$-2\ -2$
$x=-1$

b) $y = 5^{x-3} + 2$

$x=0$

$5^{0-3}+2$

$5^{-3}+2$

$\frac{1}{125}+2$

$x-3=0$
$+3\ +3$
$x=3$ (3, 3)

$5^{3-3}+2$

5^0+2

$1+2=3$

$x-3=1$
$+3\ +3$
$x=4$ (4, 7)

$5^{4-3}+2$

5^1+2

$5+2=7$

4.) (2 pts each, 4 pts total) Write each logarithmic equation in its equivalent exponential form.

log is an exponent

a) $\log_6 216 = 3$

$6^3 = 216$

b) $\log_b x = a$

$b^a = x$

5.) (2 pts each, 4 pts total) Write each exponential equation in its equivalent logarithmic form.

a) $4^7 = 16384$ $\log_4 16384 = 7$

b) $0.001 = 10^{-3}$

$10^{-3} = 0.001$ $\log_{10} 0.001 = -3$

6.) (2 pts each, 4 pts total) Evaluate the logarithms exactly. <u>Show conversion to exponential form for full credit.</u>

a) $\log_8 1$

b) $\log 10^{-5}$

7.) (8 pts total) State the domain of the logarithmic function. Please show work (do not simply graph).

$$f(x) = log_3 (x - 2)$$