

AA4 Test Review

LT AA4a: I can use the definition of logarithms to evaluate logarithms and convert between logarithmic and exponential forms.

10 8.5 7.5 5

Solve for x

$$1) \quad \begin{array}{r} 5^x - 10 = 80 \\ +10 \quad +10 \\ \hline \end{array}$$

$$5^x = 90$$

$$x = \log_5 90$$

$$x = \frac{\log 90}{\log 5}$$

$$x = 2.80$$

$$2) \quad \begin{array}{r} 3^{4x-2} = 27 \\ \downarrow \rightarrow \end{array}$$

$$4x - 2 = \log_3 27$$

$$4x - 2 = 3$$

$$\begin{array}{r} +2 \quad +2 \\ \hline \end{array}$$

$$4x = \frac{5}{4}$$

$$x = 1.25$$

$$3) \quad \begin{array}{r} e^{3x-2} = 2 \\ \downarrow \rightarrow \end{array}$$

$$3x - 2 = \log_e 2$$

$$\begin{array}{r} 3x - 2 = .69 \\ +2 \quad +2 \\ \hline \end{array}$$

$$3x = 2.69$$

$$x = \frac{2.69}{3} \approx .90$$

$$x = .90$$

$$4) \quad \log_4(5x) - \log_4(1) = 10$$

$$\therefore \log_4 \left(\frac{5x}{1} \right) = 10$$

$$\begin{array}{r} 5x = 4^{10} \\ \frac{5x}{5} = \frac{4^{10}}{5} \end{array}$$

$$x = 209715.2$$

5) $b^x = d$ and $\log_b(d) = x$ are equivalent. Explain why and show algebraic work.

$$\begin{array}{c} b^x = d \\ \downarrow \quad \uparrow \\ \rightarrow \quad \downarrow \\ x = \log_b d \end{array}$$

Yes, because we can convert a log to exponential and an exponential to a Log.

Identify the transformation and then graph each transformation on graph paper.

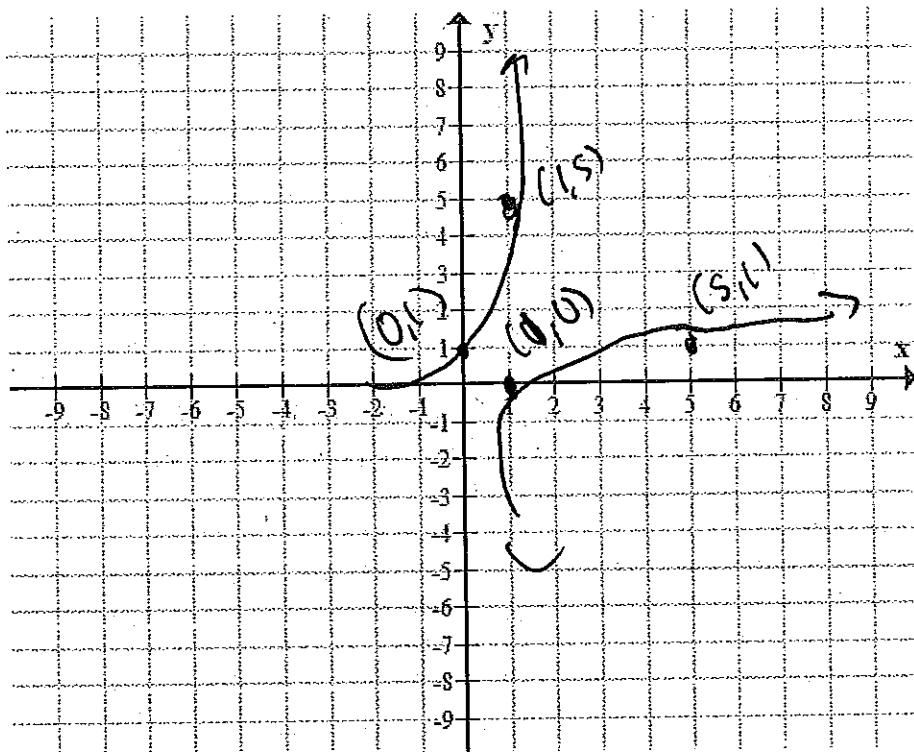
6) $y = \log_5(x + 2) - 4$

increasing
Left 2, Down 4
 $x = -2$

7) $y = 3^{x-4} + 6$

increasing
right 4, up 6
 $y = 6$

7.) Graph $y = 5^x$ and $y = \log_5 x$. Compare and contrast the two graphs. Then describe the graphs in at least three sentences. How are the graphs different and how are the graphs the same?



8.) Solve for x

a. $\log_4 x = 8$

$x = 4^8$
 $= 65,536$

b. $\log_4 64 = x$

$\frac{\log 64}{\log 4}$

c. $\log_x 100 = 2$

$\sqrt{100} = x^2$
 $10, -10 = x$

d. $3\log_2(x) + 5 = 14$

$x = 8$

9.) Write as an equivalent logarithm equation (convert to log form). DO NOT SOLVE!!!

a. $4^x = 52$

$$x = \log_4 52$$

b. $e^{(x+2)} = 50$

$$x+2 = \log_e 50$$

10.) Write as an equivalent exponential equation (convert to exponential form). DO NOT SOLVE!!

a. $\log_x 142 = 5$

$$142 = x^5$$

b. $\log(x) = 10$

$$x = 10^{10}$$

11.) Cameron got \$1000 for his 10th birthday. Help him figure out how long it would take him to triple his money in an account that pays 2.5% compounded annually.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$3000 = 1000 \left(1 + \frac{0.025}{1} \right)^{1 \cdot t}$$

$$3000 = 1000 (1 + 0.025)^t$$

$$\frac{3000}{1000} = \frac{1000}{1000} (1.025)^t$$

$$3 = (1.025)^t$$

$$\log_{1.025} 3 = t$$

$$\frac{\log(3)}{\log(1.025)} = t$$

44 yrs

$r = 2.5$