Station #1

Calculate the value of the items below using this formula:

$$P = P_0(1 \pm r)^t$$

a) A $20,000 car depreciates annually for eight years at 4%.

$P = 20000(1 - .04)^8$

$= \$14427.80$

b) A $100,000 home appreciates at 5% from 1985 to 2000.

$P = 100000(1 + .05)^{15}$

$= \$207892.82$

Station #2

Convert these expressions between exponential form and logarithmic form. Then, solve for the variables.

a) $\log_3 81 = y$
b) $5 = \log_2 x$
c) $7^c = 14$
d) $e^{3t} = 50$ (e is not a variable.)\
e) $10^g = 5$

a) $3^y = 81 \Rightarrow y = 4$

b) $2^5 = x \Rightarrow x = 32$

c) $\log_7 14 = c \Rightarrow c = 1.356$

d) $\log_e 50 = 3t$

$\frac{\ln 50}{3} = t \Rightarrow t = 1.304$

e) $\log_{10} 5 = g$

$\log 5 = g \Rightarrow g = 0.699$

Station #3

Expand these problems using all properties of logarithms:

a) $\log_3 rt$ $= \log_3 r + \log_3 t$

b) $\log_f k^3$ $= 3\log_f K$

c) $\log_5 2f^3h^4$ $= \log_5 2 + \log_5 f^3 + \log_5 h^4$

$= \log_5 2 + 3\log_5 f + 4\log_5 h$

d) $\ln\frac{u}{7}$ $= \ln u - \ln 7$

e) $\log_4 \frac{3y}{gh}$ $= \log_4 3y - \log_4 gh$

$= (\log_4 3 + \log_4 y) - (\log_4 g + \log_4 h)$

f) $\log_9 \frac{2d}{5w^3}$

$= \log_9 2d - \log_9 5w^3$

$= (\log_9 2 + \log_9 d) - (\log_9 5 + 3\log_9 w)$

Station #4

Condense these problems using properties of logarithms:

a) $\log_2 t + \log_2 6 + \log_2 k$

b) $2\log_4 m + 5\log_4 n + \log_4 k$

c) $\frac{1}{2}\log_8 a + \frac{1}{3}\log_8 b$

d) $\log_3 y - \log_3 6 - 2\log_3 t$

e) $2\log_6 t + 3\log_6 t + 5\log_6 t$

a) $\log_2 (6Kt)$

b) $\log_4 m^2 + \log_4 n^5 + \log_4 K$

$= \log_4 (Km^2 n^5)$

c) $\log_8 \sqrt{a} + \log_8 \sqrt[3]{b}$

$= \log_8 (\sqrt{a} \cdot \sqrt[3]{b})$

or $\log_8 a^{1/2} b^{1/3}$

d) $\log_3 \left(\frac{y}{6t^2}\right)$

e) $\log_6 t^2 + \log_6 t^3 + \log_6 t^5$

$= \log_6 (t^2 \cdot t^3 \cdot t^5) = \log_6 (t^{10})$

Station #5

Create a formula for each table of values by using this format:

$$f(x) = a \cdot b^x$$

a)

x	$f(x)$
-1	2.5
0	5
1	10
2	20

(1, 10) $a = 5$

$f(x) = a \cdot b^x$

$\frac{10}{5} = \frac{\cancel{5} \cdot b^1}{\cancel{5}}$

$2 = b$

$\boxed{f(x) = 5 \cdot 2^x}$

b)

-1	3
0	9
1	27
2	81

c)

-1	24
0	12
1	6
2	3

d)

x	-1	0	1	2
y	0.5	2	8	32

b) $f(x) = 9 \cdot 3^x$

c) $f(x) = 12 \cdot \left(\frac{1}{2}\right)^x$

d) $f(x) = 2 \cdot 4^x$

Station #6

Solve these problems for each variable:

a) $\dfrac{20{,}000}{10000} = \dfrac{\cancel{10{,}000}e^{3t}}{\cancel{10000}}$

$$2 = e^{3t}$$

$$\ln 2 = \ln e^{3t}$$ power property

$$\ln 2 = 3t \cdot \ln e$$ $\ln e = 1$

$$\frac{\ln 2}{3} = \frac{\cancel{3}t}{\cancel{3}} \Rightarrow t = .231 \text{ or } \frac{\ln 2}{3}$$

b) $\dfrac{400{,}000}{20{,}000} = \dfrac{\cancel{20{,}000} \cdot 2^{0.05t}}{\cancel{20{,}000}}$

$$20 = 2^{0.05t}$$

$$\ln 20 = \ln 2^{0.05t}$$ power prop.

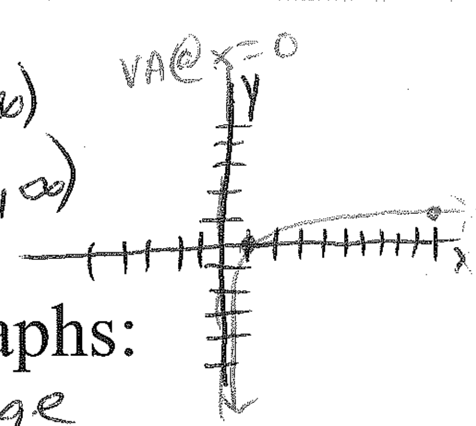
$$\frac{\ln 20}{0.05 \cdot \ln 2} = \frac{\cancel{0.05}t \cdot \cancel{\ln 2}}{\cancel{0.05} \cdot \cancel{\ln 2}}$$

$$t = 86.439$$

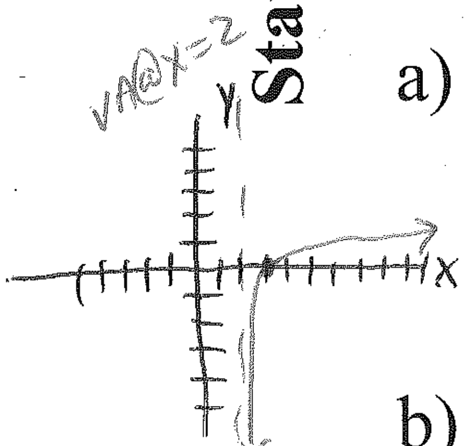
Station #7

Graph the parent graph $y = \log_{10} x$ and these graphs:

D: $(0, \infty)$
R: $(-\infty, \infty)$



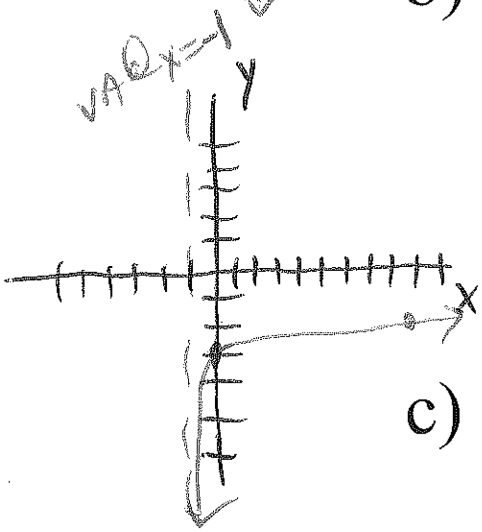
Find Domain + Range



a) $y = \log_{10}(x - 2)$ How does this graph differ from the parent graph?

D: $(2, \infty)$
R: $(-\infty, \infty)$

shifted right 2 units



b) $y = \log_{10}(x + 1) - 3$ Explain how this graph differs from the parent graph.

D: $(-1, \infty)$
R: $(-\infty, \infty)$

shifted left 1 unit and down 3 units

c) Explain how the parent graph should be used to graph: $y = \log_{10}(x - h) + k$

answers vary