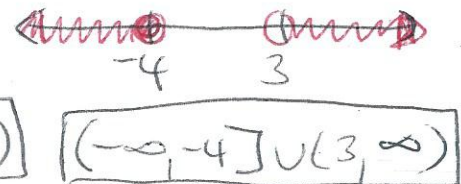
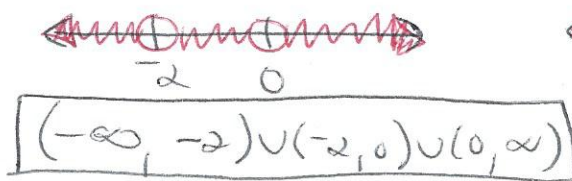
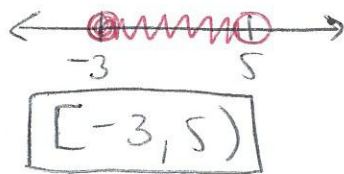


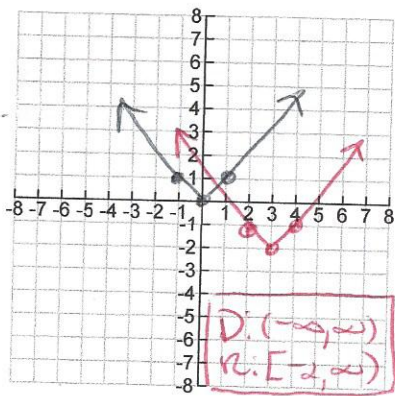
Adv Functions - Review for Unit #4 Test w/3 Key

1) a) $-3 \leq x < 5$ b) $\mathbb{R}, x \neq -2, 0$ c) $x \leq -4$ or $x > 3$

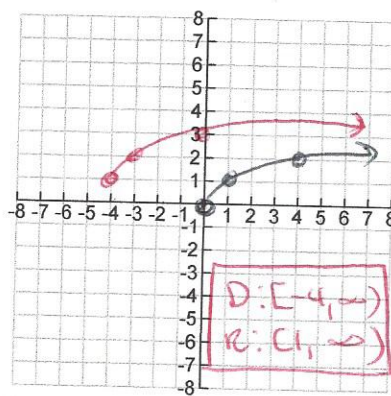


2) quadratic, cubic, abs. value, cube root, sq. root
 $(y=x^2)$ $(y=x^3)$ $(y=|x|)$ $(y=\sqrt[3]{x})$ $(y=\sqrt{x})$

3) $y = |x-3| - 2$



4) $y = \sqrt{x+4} + 1$



7) a) $3^2 = 9$

$\log_3 9 = 2$

b) $\log_8 \left(\frac{1}{512}\right) = -3$

$8^{-3} = \frac{1}{512}$

8) a) $\log_5 625 = x$

$5x = 625 \rightarrow x = 4$

b) $\log_4 \left(\frac{1}{32}\right) = x$

$4^x = \frac{1}{32}$
 $2^{2x} = 2^{-5} \rightarrow x = -\frac{5}{2}$

c) $\log_x 4 = \frac{1}{3}$

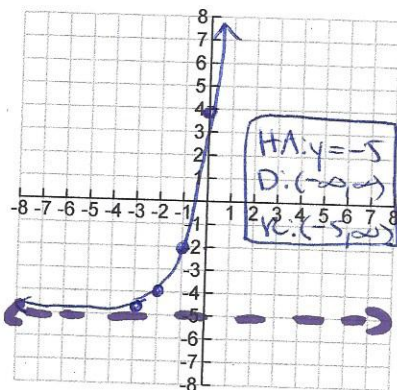
$\sqrt[3]{x} = 4 \rightarrow x = 64$

d) $e^{\ln 4 - \ln 2}$
 $e^{\ln 2} \rightarrow 2$

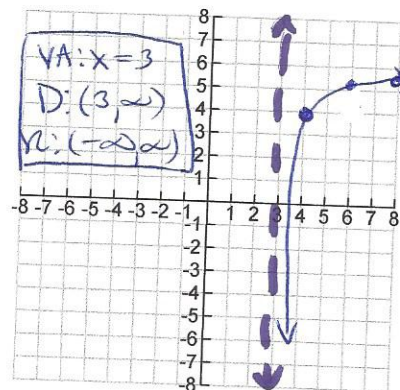
e) $\log_{12} 7 + \log_3 9$
 $\log_3 3^3 + \log_3 3^2 = 3 + 2 = 5$

f) $\log \sqrt{100}$
 $\log_{10} (10^3)^{1/2} = x$
 $10x = 10^{3/2} \rightarrow x = 3/2$

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



6) $y = \ln(x-3) + 4$



key control

9.) a) $8^{2x+4} = 32$

$$(2^3)^{2x+4} = 2^5$$

$$6x + 12 = 5$$

$$\frac{6x}{6} = \frac{-7}{6}$$

$$\boxed{X = -1.167}$$

b) $6^{6-4x} = \frac{1}{36}$

$$6^{6-4x} = 6^{-2}$$

$$6 - 4x = -2$$

$$\frac{-4x}{-4} = \frac{-8}{-4}$$

$$\boxed{X = 2}$$

c) $4^{3x+5} = 3$

$$\frac{(3x+5) \log 4}{\log 4} = \frac{\log 3}{\log 4}$$

$$3x + 5 = .752481$$

$$\frac{3x}{3} = \frac{-4.207519}{3}$$

$$\boxed{X = -1.403}$$

d) $6e^{4x-1} - 4 = 8$

$$6e^{4x-1} = 12$$

$$e^{4x-1} = 2$$

$$4x - 1 = \ln(2)$$

$$\frac{4x}{4} = \frac{\ln(2) + 1}{4}$$

$$\boxed{X = .423}$$

10) a) $\log_5(2x+4) - \log_5 3 = \log_5 10$

$$\log_5\left(\frac{2x+4}{3}\right) = \log_5 10$$

$$\frac{2x+4}{3} = \frac{10}{1}$$

$$2x + 4 = 30$$

$$2x = 26$$

$$\boxed{X = 13}$$

b) $\log_2 9 \cdot \log_2 X = \log_2 144$

$$\log_2 9x^2 = \log_2 144$$

$$9x^2 = 144$$

$$x^2 = 16$$

$$x = \pm 4$$

$$\boxed{X = 4}$$

$$x = -4 \rightarrow \text{excl}$$

c) $2 \log_7(-9x-8) - 1 = 5$

$$2 \log_7(-9x-8) = 6$$

$$\log_7(-9x-8) = 3$$

$$343 = -9x - 8$$

$$351 = -9x$$

$$\boxed{X = -39}$$

d) $3 - 4 \ln(x+6) = 7$

$$-4 \ln(x+6) = 4$$

$$\ln(x+6) = -1$$

$$e \quad e$$

$$x+6 = e^{-1}$$

$$\frac{-6}{-6} \quad \frac{-6}{-6}$$

$$\boxed{X = -5.632}$$

11) a) $81^{-2x-1} \cdot 9^x = 27^{1-2x}$

$$(3^4)^{-2x-1} \cdot (3^2)^x = (3^3)^{1-2x}$$

$$-8x - 4 + 2x = 3 - 6x$$

$$\frac{-6x}{+6x} - 4 = \frac{3-6x}{+6x}$$

$$-4 \neq 3$$

$$\text{false} \rightarrow \boxed{\emptyset}$$

b) $4 - 2^{3x+4} = 10$

$$-2^{3x+4} = 6$$

$$2^{3x+4} = -6$$

$$(3x+4) \log 2 = \log(-6)$$

can't do

$$\rightarrow \boxed{\emptyset}$$

c) $\log_3(2x-10) = \log_3(5x+8)$

$$\frac{2x-10}{-5x+10} = \frac{5x+8}{-5x+10}$$

$$-3x = 18$$

$$x = -6 \rightarrow \text{excl}$$

$$\boxed{\emptyset}$$

key cont'd

b) $A = P(1+tr)^t$

$$A = 200(1+.06)^8$$

$$\boxed{A = \$318.77}$$

13) $A = Pert$

$$\frac{2670}{1200} = \frac{1200}{1200} e^{sr}$$

$$2.225 = e^{sr}$$

$$\frac{\ln 2.225}{5} = \frac{sr}{5}$$

$$r = .14 \rightarrow \boxed{\text{about } 14\%}$$

14) $A = P(1-r)^t$

$$10479 = P(1-.08)^{12}$$

$$\frac{10479}{(.92)^{12}} = \frac{P}{(.92)^{12}}$$

$$\boxed{P = \$28,501 \text{ (about)}}$$

15) $R = 75 - [6 \ln(t+1)]$

$$54.5 = 75 - [6 \ln(t+1)]$$

$$\frac{-20.5}{-6} = \frac{-6 \ln(t+1)}{-6}$$

$$\frac{3.416667}{e} = \frac{\ln(t+1)}{e}$$

$$\frac{e^{3.416667}}{1} = \frac{t+1}{1}$$

$$t = 29.5 \text{ months}$$

$$\approx \boxed{\text{about } 2.5 \text{ year}}$$

16) $A = P(1+\frac{r}{n})^{nt}$ or $A = Pert$

$$A = 1500(1+\frac{.07}{12})^{12t} \text{ or } A = 1500e^{.07t}$$

a) $2126 = 1500(1+\frac{.07}{12})^{12t}$

$$1.417333 = (1.005833)^{12t}$$

$$\frac{\log 1.41733}{(12 \log 1.005833)} = \frac{12t \log 1.005833}{(12 \log 1.005833)}$$

$$\uparrow$$

$$\boxed{t = 5 \text{ years}}$$

b) $\frac{4500}{1500} = \frac{1500}{1500} e^{.07t}$

$$3 = e^{.07t}$$

$$\frac{\ln 3}{.07} = \frac{.07t}{.07} \rightarrow \boxed{t = 15.7 \text{ years}}$$

17) $pH = -\log(H)$

a) $pH = -\log(6.5 \times 10^{-8})$

$$\boxed{pH = 7.2}$$

b) $2.6 = -\log(H)$

$$\log H = \frac{-2.6}{1}$$

$$H = 10^{-2.6}$$

$$\boxed{H = 2.5 \times 10^{-3} M}$$

18) $D = 10(\log I + 12)$

a) $D = 10(\log(2.16 \times 10^3) + 12)$

$$\boxed{D = 155 \text{ dB}}$$

b) $92 = 10(\log I + 12)$

$$9.2 = \log I + 12$$

$$\log I = \frac{-2.8}{1}$$

$$I = 10^{-2.8}$$

$$\boxed{I = 1.58 \times 10^{-3} \text{ W/m}^2}$$

key cont'd

19) a) $f(x) = \sqrt{\frac{36}{x^{10}}}$

$f(x) = 6x^{-8}$

Power $\rightarrow k=6$
 $p=-8$

b) $f(x) = 9.5x$

No power \rightarrow
 $k=p=N/A$

20) $y = k \cdot x^p$

$(13, 12)$ and $(1, 10)$

$y = 10 \cdot x^p$

$12 = 10(13)^p$

$1.2 = (13)^p$

$\frac{\log 1.2}{\log 13} = \frac{p \log 13}{\log 13}$

$p = .0711 \rightarrow y = 10x^{.0711}$

21) $T = \frac{k}{V} \rightarrow T = \frac{3150}{V}$

$30 = \frac{k}{105}$

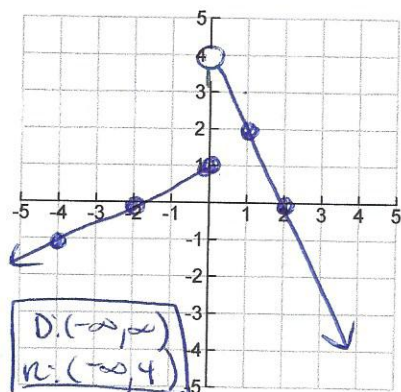
$k = 3150$

$37.5 = \frac{3150}{V}$

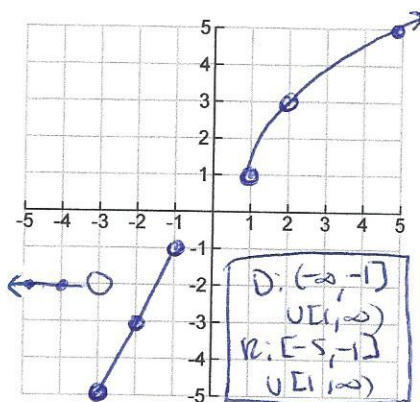
$37.5V = \frac{3150}{37.5}$

$V = 84 \text{ cm}^3$

22) a) $f(x) = \begin{cases} \frac{1}{2}x+1 & \text{if } x \leq 0 \\ 4-2x & \text{if } x > 0 \end{cases}$



b) $f(x) = \begin{cases} -2 & \text{if } x < -3 \\ 2x+1 & \text{if } -3 \leq x \leq -1 \\ 2\sqrt{x-1}+1 & \text{if } x \geq 1 \end{cases}$



23) $f(x) = \begin{cases} .34x+4 & \text{if } 0 < x \leq 5 \\ .44x+6 & \text{if } 5 < x < 9 \\ .54x+8 & \text{if } x \geq 9 \end{cases}$

60¢ letter $\rightarrow .44(6)+6 = \$8.64$

90¢ letter $\rightarrow .54(9)+8 = \$12.86$

$\$21.50$