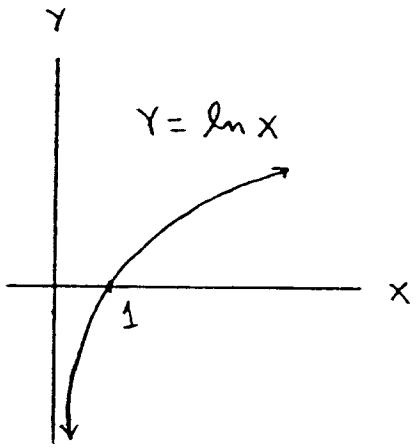
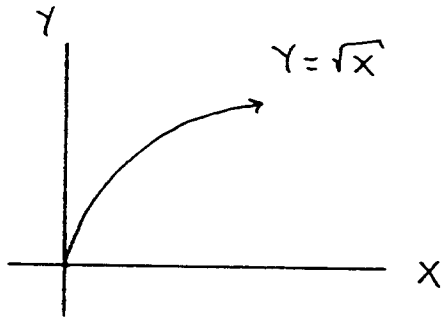
ESP
Kouba
Worksheet 2 Solutions

1.) a.)



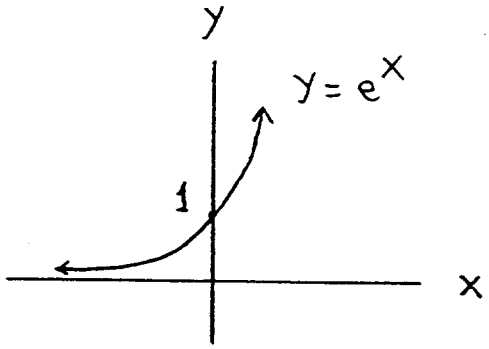
Domain : all #'s > 0
Range : all #'s

b.)



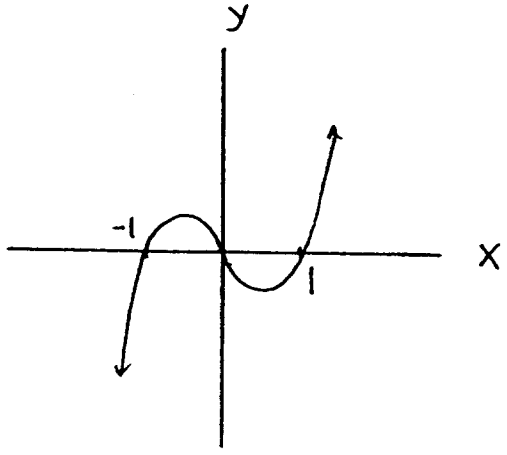
Domain : all #'s ≥ 0
Range : all #'s ≥ 0

c.)



Domain : all #'s
Range : all #'s > 0

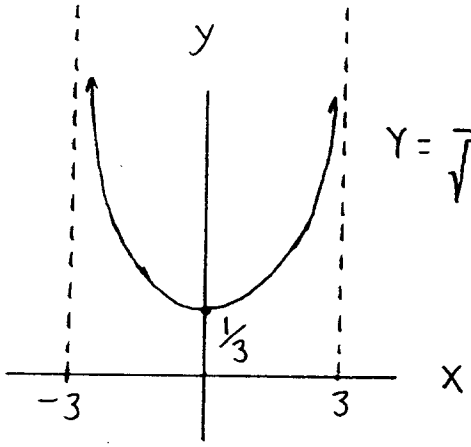
d.)



Domain : all #'s
Range : all #'s

$Y = x^3 - x = x(x-1)(x+1)$

e.)

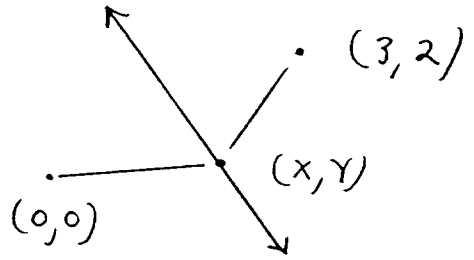


$Y = \dfrac{1}{\sqrt{9-x^2}}$

Domain: all #'s x, with $-3 < x < 3$

Range: all #'s $\geq \frac{1}{3}$

2.)



$\sqrt{(x-0)^2+(y-0)^2} = \sqrt{(x-3)^2+(y-2)^2} \rightarrow$

$x^2+y^2 = x^2-6x+9+y^2-4y+4 \rightarrow$

$6x+4y = 13$

3.) 1, 2, 4, 9, 19, 36, 62, ___, ___, ___, ...

1 2 5 10 17 26 37 50 65

1 3 5 7 9 11 13 15

4.) a.) $f(x) = x$, $b = 1$, $c = 2$

b.) $f(x) = x^2$, $b = 1$, $c = 1$

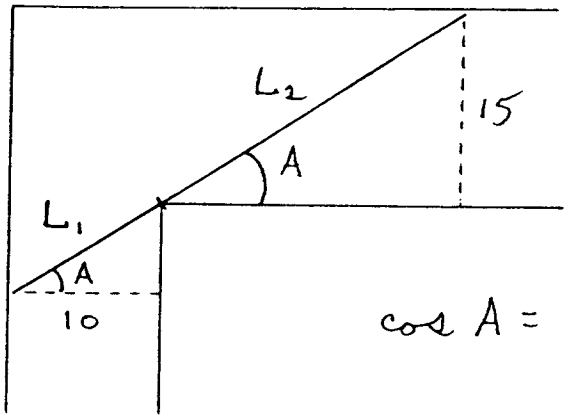
5.) $f(x) = 2 + \dfrac{x}{x+1}$ so $f(g(x)) = x \rightarrow$

$2 + \dfrac{g(x)}{g(x)+1} = x \rightarrow 2(g(x)+1) + g(x) = x(g(x)+1) \rightarrow$

$3g(x) + 2 = x\,g(x) + x \rightarrow (3-x)\,g(x) = x-2 \rightarrow$

$g(x) = \dfrac{x-2}{3-x}$ works.

6.)



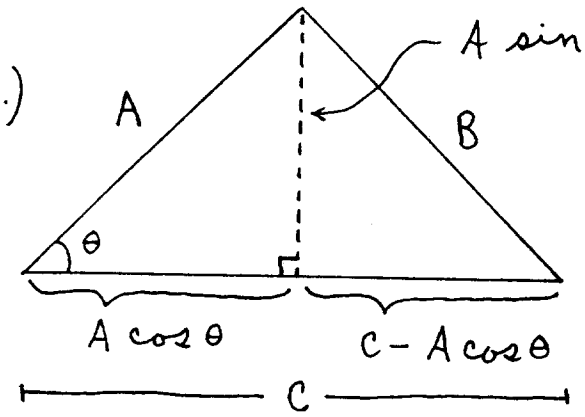
$L = L_1 + L_2$,

$\cos A = \frac{10}{L_1}$ so $L_1 = \frac{10}{\cos A} = 10 \sec A$

$\sin A = \frac{15}{L_2}$ so $L_2 = \frac{15}{\sin A} = 15 \csc A$,

then $L = 10 \sec A + 15 \csc A$.

7.)



a.) Area $= \frac{1}{2}$ (base)(height)

$= \frac{1}{2} C \cdot A \sin\theta$

b.) $\frac{2 \text{ Area}}{AC} = \sin\theta$ and

$(A \sin\theta)^2 + (C - A\cos\theta)^2 = B^2 \rightarrow$

$A^2 \sin^2\theta + C^2 - 2AC\cos\theta + A^2\cos^2\theta = B^2 \rightarrow$

$A^2 + C^2 - 2AC\cos\theta = B^2 \rightarrow \cos\theta = \frac{A^2 + C^2 - B^2}{2AC}$;

$\cos^2\theta + \sin^2\theta = 1 \rightarrow \left(\frac{A^2 + C^2 - B^2}{2AC}\right)^2 + \left(\frac{2 \text{ Area}}{AC}\right)^2 = 1 \rightarrow$

$16 (\text{Area})^2 = 4A^2C^2 - (A^2 + C^2 - B^2)^2$ so

$$\text{Area} = \frac{1}{4}\left[2(A^2B^2 + B^2C^2 + A^2C^2) - (A^4 + B^4 + C^4)\right]^{1/2} .$$