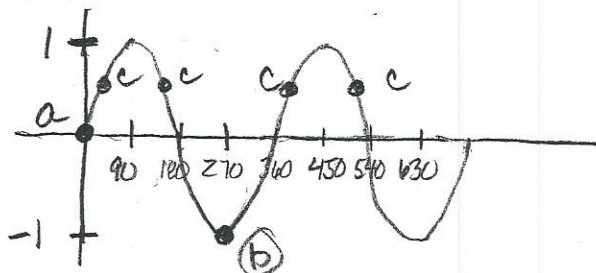


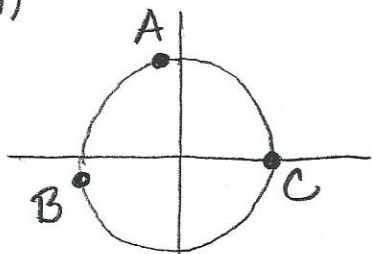
Monday 3/16 7.1.3 (7-36 → 7-44)

7-36)  $s(t) = \sin t$



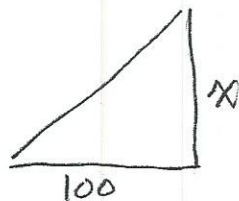
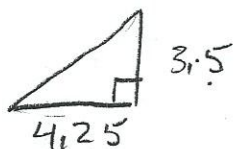
- a) gets on
- b) bottom water
- c) half way up

7-37)



- a) Above ground just past highest pt.
- b) Just below ground
- c) Back to the start

7-38)



$$\frac{x}{3.5} = \frac{100}{4.25}$$

$$x = \frac{3.5(100)}{4.25} = 82.44$$

Similar Figures

7-39)  $\log 2 = .3010$     $\log 3 = .4771$     $\log 5 = .6990$

a)  $\log 6 = \log 2 + \log 3 = .3010 + .4771 = .7781$

b)  $\log 15 = \log 3 + \log 5 = .4771 + .6990 = 1.1761$

c)  $\log 9 = \log 3 + \log 3 = .4771 + .4771 = .9542$

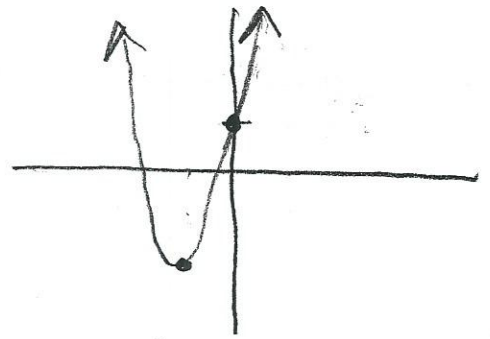
d)  $\log 50 = \log 10 \cdot 5 = \log 2 \cdot 5 \cdot 5 =$   
 $\log 2 + \log 5 + \log 5 = 1.6990$

7-40)  $y = 3x^2 + 6x + 1$    Can't Factor - use Quad. Formula

$$\frac{-6 \pm \sqrt{(6)^2 - 4(3)(1)}}{2(3)} = \frac{-6 \pm \sqrt{36 - 12}}{6} = \frac{-6 \pm \sqrt{24}}{6} = \frac{-6 \pm 2\sqrt{6}}{6}$$

$$x = \frac{-3 \pm \sqrt{6}}{3} \quad \left. \begin{array}{l} y = 3(\cancel{\phi})^2 + 6(\cancel{\phi}) + 1 \\ \boxed{y = 1} \end{array} \right\}$$

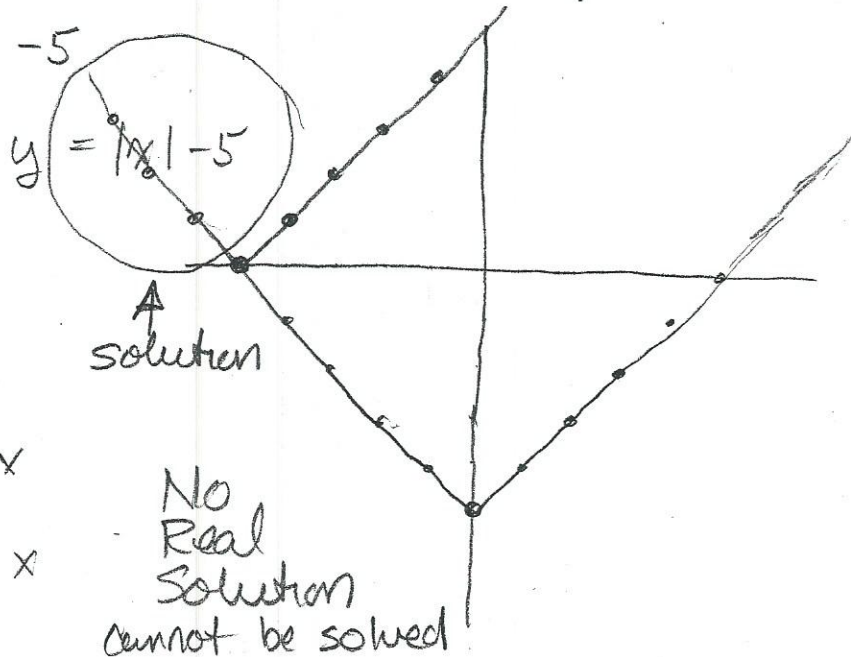
$$\begin{aligned}
 7-41) \quad & y = 3x^2 + 6x + 1 \\
 & y = 3(x^2 + 2x) + 1 \\
 & y = 3(x^2 + 2x + 1) + 1 - 3 \\
 & y = 3(x+1)(x+1) - 2 \\
 & y = 3(x+1)^2 - 2
 \end{aligned}$$



$$7-42 \quad |x+5| = |x| - 5$$

$$y = |x+5|$$

$$x \leq -5$$



$$\begin{aligned}
 7-43) \quad & \log_2 x = 2^x \\
 & \frac{\log x}{\log 2} = 2^x
 \end{aligned}$$

No Real Solution cannot be solved

$$\begin{aligned}
 7-44) \quad & W = C - 5 \\
 & 2P = C \\
 & W + P + C = 40
 \end{aligned}$$

$$|x| - C = 5$$

$$\begin{aligned}
 3(W - 2P = 5) \\
 W + P + 2P = 40 \\
 2(W + 3P = 40)
 \end{aligned}$$

$$\begin{aligned}
 3W - 6P &= 15 \\
 2W + 6P &= 80 \\
 \hline
 5W &= 95 \\
 W &= 19
 \end{aligned}$$

$$\begin{aligned}
 13 &= C - 5 \\
 18 &= C
 \end{aligned}$$

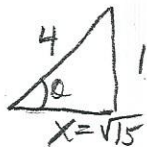
$$\begin{aligned}
 2P &= 18 \\
 P &= 9
 \end{aligned}$$

$$\begin{aligned}
 \text{Cal} &= 19 \\
 \text{Wash} &= 13 \\
 \text{Penn} &= 9
 \end{aligned}$$

Tue/Wed 3/17 & 3/18 (7.1.4 7-53 → 7-70)

7-53)  $\sin \theta = \frac{1}{4}$

$y = \frac{1}{4} = .25$



$\sin^{-1} \frac{1}{4} = 14.5^\circ$

$\cos \theta = \frac{\sqrt{15}}{4}$

$x^2 + 1^2 = 4^2$

$x^2 + 1 = 16$

$x^2 = 15$

$x = \sqrt{15}$

$(\frac{\sqrt{15}}{4}, \frac{1}{4})$

7-54) P:  $\sin 50 = \frac{y}{1}$

$y = .766$

$\cos 50 = \frac{x}{1}$

$x = .6428$

Q  $\sin 110 = y = .9397$

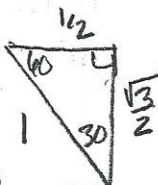
$\cos 110 = x = -.3420$

7-55) a)  $360 - 60 = 300^\circ$

b)  $\sin 300 = SR = -.8660$

$\cos 300 = SO = .5$

$\begin{matrix} = \frac{\sqrt{3}}{2} \\ = \frac{1}{2} \end{matrix}$



c)  $(\frac{1}{2}, -\frac{\sqrt{3}}{2})$

7-56) a)  $30^\circ$

c)  $180 - 113 = 67^\circ$

b)  $60^\circ$

d)  $203 - 180 = 23^\circ$

7-57)  $(\frac{1}{8})^{2x-3} = \frac{1}{2}^{(x+2)}$

$(\frac{1}{2})^{3(2x-3)} = \frac{1}{2}^{(x+2)}$

$3(2x-3) = x+2$

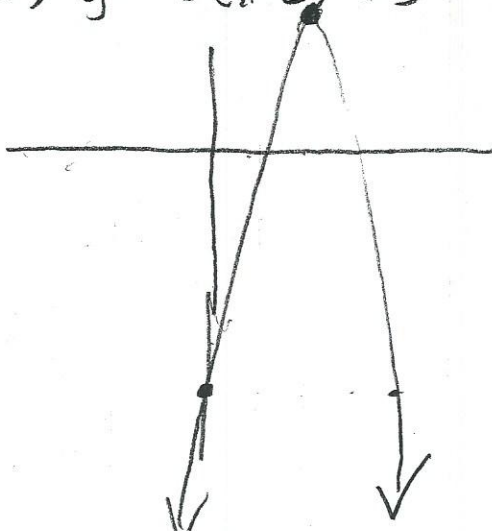
$6x-9 = x+2$

$5x = 11$

$x = \frac{11}{5}$

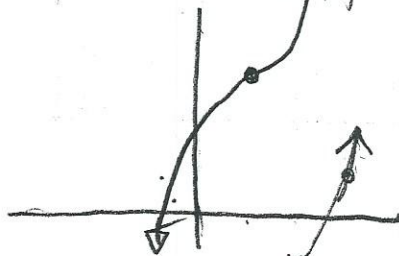
7-58) a)  $y = -2(x-2)^2 + 3$   $v(2, 3)$

if  $x=0, y=-5$



b)  $y = (x-1)^3 + 3$  pt of inflection (1, 3)  
cubic

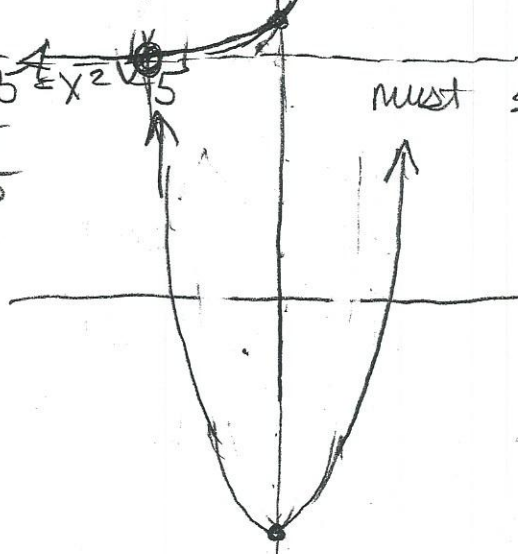
if  $x=0, y=2$



7-59)  $3^x + 5 = x^2 - 5$  must solve graphically

$y = 3^x + 5$   
 $y = x^2 - 5$

x	y
0	6
1	8
2	14
-1	5.33
-2	



$x \approx -3.2$

7-60) a)  $25dt, 50m = R$

$.03(2)^{m-1} = T$

Teacher - multiplier = 2

1	.06
2	.12
3	.24

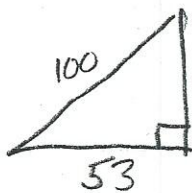
b) 10:  $R = 25(2) + 5 = 55$   
 $T = .03(2)^9 = 15.36 \star$

20:  $R = 25(2) + .5(20) = 60 \star$   
 $T = .03(2)^{20-1} = 15.128$

100:  $R = 2(25) + 100(.5) = 100 \star$   
 $T = .03(2)^{99} \approx 1.9 \times 10^{29}$

7-61) all three problems use the same system of equations

7-62)



radius = 100 ft  
from the lesson

$$\cos \theta = \frac{53}{100} = .53$$

$$\cos^{-1} .53 = 58^\circ$$

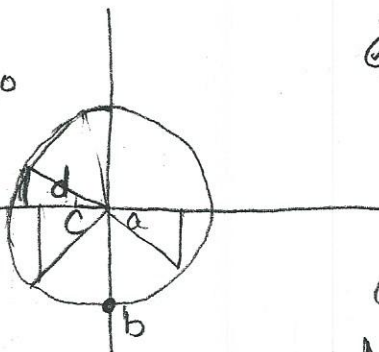
1st Quad =  $58^\circ$

2nd Quad =  $180 - 58 = 122^\circ$

3rd Quad =  $180 + 58 = 238^\circ$

4th Quad =  $360 - 58 = 302^\circ$

- 7-63) a) 4th Quad  
b)  $-90$  or  $270^\circ$   
c) 3rd Quad  
d) about  $160^\circ$



$$\sin^{-1} .9 = 64^\circ$$

$$\cos 64 = .438$$

$$\text{or } \cos 116 = -.438$$

Not Possible

$.8, .9$  not on the unit circle

7-64) a)  $y = \sin 70 = .9397$   
 $x = \cos 70 = .3420$   $(.3420, .9397)$

b)  $(\cos 70, \sin 70)$

c)  $(\cos 70)^2 + (\sin 70)^2 = .1170 + .8830 = 1$

7-65) Graph 2 is sine while graph 1 is cosine.  
Since  $\sin(0) = 0$  it passes through the origin  
 $\cos(0) = 1$  and passes through  $(0, 1)$

7-66)  $y = \cos x$   $y = -1$  a) Can solve by graphing  
subst. & elimination

b)  $\cos x = -1$

Solutions  $\pm 180, \pm 540, \pm 900$  etc

c)  $x = (-180 + 360n)$  for all integers  $n$

$$7-67) \quad y = x^2 + 4x - 17$$

Cannot factor, use  
Quad Formula

$$x = \frac{-4 \pm \sqrt{(4)^2 - 4(1)(-17)}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{16 + 68}}{2} = \frac{-4 \pm \sqrt{84}}{2} = \frac{-4 \pm 2\sqrt{21}}{2} = -2 \pm \sqrt{21}$$

$$y \text{ int} = -17$$

$$x \text{-int: } (-2 + \sqrt{21}, 0) \quad y \text{-int: } (0, -17)$$

$$(-2 - \sqrt{21}, 0)$$

$$7-68) \quad a) \quad \frac{3}{x+1} = \frac{4}{x}$$

$$3x = 4x + 4$$

$$\boxed{-4 = x}$$

$$b) \quad \frac{3}{x+1} + \frac{4}{x} = 2$$

multiply by  $x(x+1)$

$$\frac{x(x+1)}{1} \cdot \frac{3}{x+1} + \frac{x(x+1)}{1} \cdot \frac{4}{x} = x(x+1) \cdot 2$$

$$3x + 4(x+1) = 2x^2 + 2x$$

$$3x + 4x + 4 = 2x^2 + 2x$$

$$7x + 4 = 2x^2 + 2x$$

$$0 = 2x^2 - 5x - 4$$

Can't factor

$$\frac{5 \pm \sqrt{25 - 4(2)(-4)}}{4} = \frac{5 \pm \sqrt{25 + 32}}{4} = \boxed{\frac{5 \pm \sqrt{57}}{4}}$$

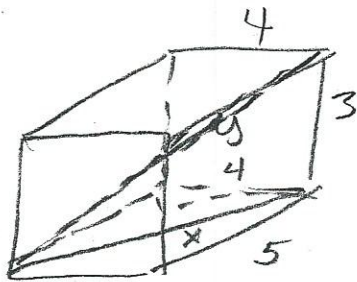
$$c) \quad \frac{3}{x+2} + 5 = \frac{3}{x+2} \quad \text{No Solution}$$

$$5 \neq 0$$

$$d) \quad \text{Subtracting } \frac{3}{x+2} \text{ from both sides leaves}$$

$$5 = 0 \quad \nabla \quad 5 \neq 0$$

7-69)



$$x^2 = 5^2 + 4^2 = 25 + 16 = 41$$

$$x^2 = 41$$

$$x = \sqrt{41} = 6.4$$

$$y^2 = x^2 + 3^2 = 41 + 9 = 50$$

$$y^2 = 50$$

$$y = \sqrt{50} = \boxed{7.07 \text{ feet}}$$

7-70)  $t(n) = 9n - 2$

Tess is correct. A sequence has no more than one output for each input. A sequence is a function with domain limited to positive integers. It is also discrete.

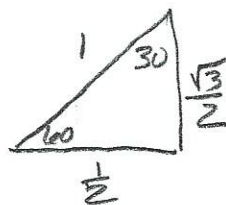
3/20 7.1.5 (7-77 → 7-85)

7-77) a)  $\sin 60 = .8660$  same;  $\frac{\pi}{3} = 60^\circ$   
 $\sin \frac{\pi}{3} = .8660$

b)  $\sin \frac{\pi}{4} = .7071$   
 same would be  $45^\circ, 135^\circ, 405^\circ$  etc

7-78) a)  $\sin\left(\frac{\pi}{4}\right) = .707 = \frac{\sqrt{2}}{2}$

b)  $\sin \frac{2\pi}{3} = .8660 = \frac{\sqrt{3}}{2}$   
 $\frac{2\pi}{3} = 60$



7-79) a)  $x(2x-1)(x-3) = 0$   
 $x = 0$      $2x - 1 = 0$   
 $2x = 1$   
 $x = \frac{1}{2}$

$$x - 3 = 0$$

$$x = 3$$

set each factor equal to zero and solve

$$7-79) \text{ cont'd b) } 2x^3 + x^2 - 3x = 0$$

$$x(2x^2 + x - 3) = 0$$

$$A.C. = -6$$

$$3 \quad -2$$

$$x(2x^2 - 2x + 3x - 3) = 0$$

$$x(2x(x-1) + 3(x-1)) = 0$$

$$x(x-1)(2x+3)$$

$$x=0$$

$$x=1$$

$$x = -3/2$$

Factor then set each factor equal to zero

$$7-80) \text{ a) } 5^x = 72$$

$$\log 5^x = \log 72$$

$$x \log 5 = \log 72$$

$$x = \frac{\log 72}{\log 5} = \boxed{2.66}$$

$$\text{b) } 2^{3x} = 7$$

$$\log 2^{3x} = \log 7$$

$$3x \frac{\log 2}{\log 2} = \frac{\log 7}{\log 2}$$

$$3x = \frac{\log 7}{\log 2}$$

$$\frac{3x}{3} = \frac{2.807}{3}$$

$$x = \boxed{.936}$$

$$\text{c) } 3^{(2x+4)} = 17$$

$$(2x+4) \log 3 = \log 17$$

$$2x+4 = \frac{\log 17}{\log 3}$$

$$2x+4 = 2.58$$

$$\frac{2x}{2} = \frac{-1.42}{2}$$

$$x = \boxed{-.711}$$

$$7-81) \text{ He needed to subtract } \left(\frac{9}{4}\right)2 = \frac{18}{4}$$

$$y = 2(x^2 - 3x + \frac{9}{4}) + 2 - \frac{18}{4}$$

$$y = 2(x - 3/2)^2 + \frac{9}{2} - \frac{18}{4}$$

$$y = 2(x - 3/2)^2 - \frac{10}{4}$$

$$y = 2(x - 3/2)^2 - 5/2$$

$$V = \left(3/2, -5/2\right)$$



7-82) a)  $y = 3x^2 - 18x + 26$

$y = 3(x^2 - 6x) + 26$

$y = 3(x^2 - 6x + 9) + 26 - 27$

$y = 3(x-3)^2 - 1$

$V(3, -1)$

axis of symmetry  $x=3$

b)  $y = 3x^2 - 4x - 11$

$y = 3(x^2 - \frac{4}{3}x) - 11$

$y = 3(x^2 - \frac{4}{3}x + \frac{16}{36}) - 11 - \frac{48}{36}$

$y = 3(x - \frac{2}{3})^2 - 11 - \frac{4}{3}$

$y = 3(x - \frac{2}{3})^2 - \frac{33}{3} - \frac{4}{3}$

$y = 3(x - \frac{2}{3})^2 - 37\frac{1}{3}$

$V(\frac{2}{3}, -37\frac{1}{3})$  axis of symmetry  $x = \frac{2}{3}$

7-83) a)  $\frac{171}{3} = \frac{3(5^x)}{3}$

$57 = 5^x$   
 $\frac{\log 57}{\log 5} = \frac{x \log 5}{\log 5}$

$x = \frac{\log 57}{\log 5} = 2,51$

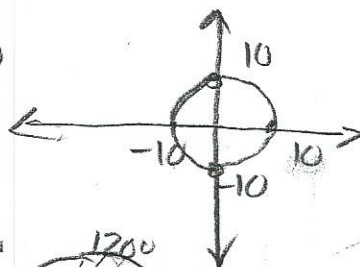
b)  $\frac{171y}{3} = \frac{3(x^5)}{3}$

$57y = x^5$

$\sqrt[5]{57y} = x$

7-84)  $x^2 + y^2 = 100$

circle  
 $C(0,0)$   
 $r = \sqrt{100} = 10$

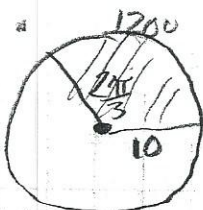


a) Not a function  
 fails vertical  
 line test

b)  $D: -10 \leq x \leq 10$

$R: -10 \leq y \leq 10$

c)  $\frac{2\pi}{3} = 120^\circ$



$\text{Lept} = 100\pi - \frac{100\pi}{3}$   
 $\frac{300\pi}{3} - \frac{100\pi}{3} = \frac{200\pi}{3}$

$\frac{2\pi}{3}$   
 $\frac{2\pi}{3}$

$\pi(10)^2 = \frac{100\pi}{3} = \text{shaded}$

$$7-85) f(x) = 2\sqrt{\frac{(x-3)}{4}} + 1$$

$$x = 2\sqrt{\frac{(y-3)}{4}} + 1$$

$$x-1 = 2\sqrt{\frac{(y-3)}{4}}$$

$$\frac{x-1}{2} = \sqrt{\frac{y-3}{4}}$$

$$\left(\frac{x-1}{2}\right)^2 = \frac{y-3}{4}$$

$$4\left(\frac{x-1}{2}\right)^2 = y-3$$

$$y = 4\left(\frac{x-1}{2}\right)^2 + 3$$

$$y = \frac{4(x-1)^2}{4} + 3$$

$$y = (x-1)^2 + 3 \uparrow$$

x is greater than / or equal to  
 $x \geq 1$

