

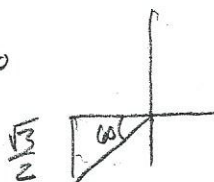
Monday 3/23 7.1.6 (7-90 → 7-98)

7-90) a)  $\sin(4) = -1.76$

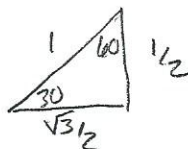
make sure calculator is in radian mode

b)  $\sin\left(\frac{4\pi}{3}\right) = -\frac{\sqrt{3}}{2}$

$\frac{4\pi}{3} = 4\left(\frac{180}{3}\right) = 240^\circ$



7-91)  $\sin(\theta) = .5$



$\theta = 30^\circ = \frac{\pi}{6}$

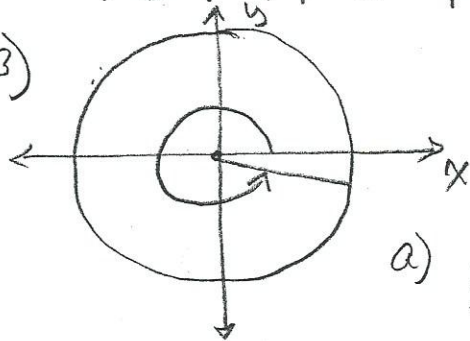
$\theta = 150^\circ = \frac{5\pi}{6}$

7-92)

Degrees	0	30	45	60	90	120	135	150	180
Radians	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	$\pi$

Degrees	210	225	240	270	300	315	330	360
Radians	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$	$2\pi$

7-93)



$2\pi = 6.28$

so 6 radians is less than 360

a)  $\frac{\theta}{360} = \frac{6}{6.28}$

$\theta = \frac{360(6)}{6.28} = 344.0$

b) estimate about  $-0.3$

7-94) a)  $\log 10 = 1$

c)  $\log_2(0)$  undefined

b)  $\log_2(\sqrt{10}) = \frac{1}{2}$

d)  $10^{(2/3)\log_2(27)} = x$

$\sqrt[3]{(27)^2} = 3^2 = 9$

$\frac{2}{3}\log_2 27 \log_2 10 = \log_2 x$   
 $\frac{2}{3}\log_2 27(1) = \log_2 x$   
 $\log_2 27^{2/3} = \log_2 x$

$x = 9$

Tues 3/24 } Wed 3/25 (7.1.7; 7-104 → 7-112  
7.2.1; 7-116 → 7-124)

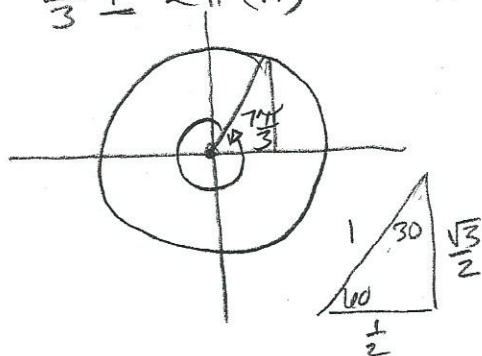
7-104)  $\frac{7\pi}{3} = \frac{7(180)}{3} = 7(60) = 420^\circ$

a)  $420 - 360 = 60$  so  $\frac{4\pi}{3} = 60$

$\frac{4\pi}{3} \pm 2\pi(n)$

$n = \#$  times around the circle

b)



c)  $\sin \frac{7\pi}{3} = \frac{\sqrt{3}}{2}$

$\cos \frac{7\pi}{3} = \frac{1}{2}$

$\tan \frac{7\pi}{3} = \frac{\sqrt{3}}{2} \div \frac{1}{2} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$

7-105) a)  $\sin(180) = 0$

b)  $\sin(360) = 0$

c)  $\sin(-90) = -1$

d)  $\sin 510 = \frac{1}{2}$

$510 - 360 = 150$



e)  $\cos 90 = 0$

f)  $\tan -90 = \frac{1}{0} = \emptyset$

7-106) You can set up a proportion or you may use  $\frac{\pi}{180}$  ( $\pi = 180^\circ$ )

7-107) a)  $\frac{7\pi}{6} = \frac{7(180)}{6} = 210^\circ$

c)  $45 = \frac{\pi}{4}$

b)  $\frac{5\pi}{3} = \frac{5(180)}{3} = 300^\circ$

d)  $\frac{100}{360} = \frac{x}{2\pi}$

$200\pi = 360x$

$x = \frac{200\pi}{360} = \frac{5\pi}{9}$

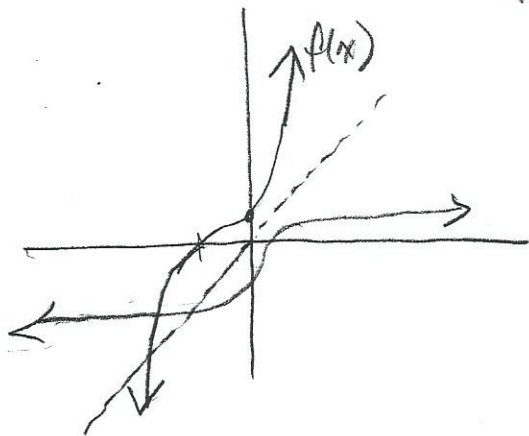
e)  $\frac{810}{360} = \frac{x}{2\pi}$

$\frac{1620\pi}{360} = x = \frac{162\pi}{36} = \frac{81\pi}{18} = \frac{27\pi}{6} = \frac{9\pi}{2}$

f)  $\frac{7\pi}{2} = \frac{7(180)}{2} = 630^\circ$

$$7-108) f(x) = \frac{1}{2}(x+1)^3$$

$$f^{-1}(x) = \sqrt[3]{2x-1}$$



7-109)

$$f(x) = 2x^2 - 16x + 34$$

$$f(x) = 2(x^2 - 8x) + 34$$

$$f(x) = 2(x^2 - 8x + 16) + 34 - 32$$

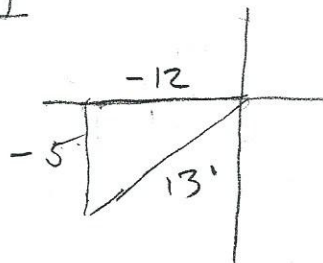
$$f(x) = 2(x-4)^2 + 2$$

7-110)

$$\cos Q = -\frac{12}{13}$$

$$a) \sin Q = -\frac{5}{13}$$

$$b) \tan Q = \frac{5}{12}$$



$$12^2 + x^2 = 13^2$$

$$144 + x^2 = 169$$

$$x^2 = 25$$

$$x = 5$$

7-111)

$$\log_x 2 = a$$

$$\log_x 5 = b$$

$$\log_x 7 = c$$

$$a) \log_x 10 = \log_x 2 + \log_x 5 = a + b$$

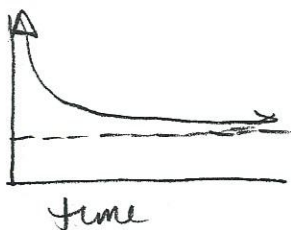
$$b) \log_x 49 = \log_x 7 + \log_x 7 = 2c$$

$$c) \log_x 50 = \log_x 2 + \log_x 5 + \log_x 5 = a + b + b = a + 2b$$

$$d) \log_x 56 = \log_x 2 + \log_x 2 + \log_x 2 + \log_x 7 = 3a + c$$

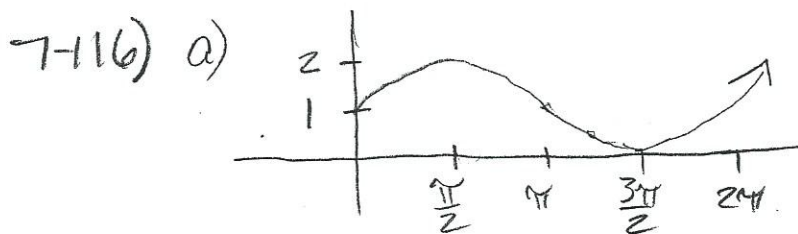
7-112) a)

temp



b) yes, the asymptote is room temperature

Begin 7.2.1 HW



b)  $y = \sin x + 1$

c) y-int.  $(0, 1)$  x-int.  $(\frac{3\pi}{2}, 0), (\frac{7\pi}{2}, 0), \dots$

d) Yes, there are infinitely many at intervals of  $2\pi$

7-117) a)  $\pi$  units to the left

b)  $y = \sin(x + \pi)$

7-118) a) This may go up or down but the cycles are probably of differing length

b) This may or may not be periodic

c) This is probably approximately periodic.

7-119) shifted down  $50^\circ$  and now start @  $\frac{\pi}{2}$  instead of zero so

$$y = 100 \sin(x + \frac{\pi}{2}) - 50$$

$$\text{or } y = 100 \cos(x) - 100$$

← This is because  $\cos x = \sin(x + 90)$  and back to original starting point

7-120) Only one needs to be the parent graph since  $y = \sin(x + 90)$  is the same as  $y = \cos x$

$$7-121) a) 18 = ab^4 \quad 3888 = ab^4$$

$$a = \frac{18}{b}$$

$$a = \frac{3888}{b^4}$$

$$\sqrt[3]{b^3} = \sqrt[3]{216}$$

$$b = 6 \quad a = 18/6 = 3$$

$$\boxed{y = 3 \cdot (6)^x}$$

$$\frac{18}{b} = \frac{3888}{b^4}$$

$$b^4(18) = 3888$$

$$\frac{b^3(18)}{18} = \frac{3888}{18}$$

$$b) -125 = ab^3 \quad -8 = ab^{-2}$$

$$a = \frac{-125}{b^3}$$

$$-8 = ab^{-2}$$

$$\frac{-125}{b^3} = -8b^2$$

$$\frac{-125}{-8} = \frac{-8b^5}{-8}$$

$$a = \frac{-8}{b^{-2}} = -8b^2$$

$$\sqrt[5]{b^5} = \sqrt[5]{3125}$$

$$b = 1.5$$

$$a = -8(1.5)^2 = -2$$

$$\boxed{y = -2(1.5)^x}$$

$$7-122) a) \frac{3}{x} + \frac{2}{x+1} = 5$$

$$3(x+1) + 2x = 5(x)(x+1)$$

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

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

$$\frac{3}{5} = \frac{5x^2}{5}$$

$$LCD = x(x+1)$$

$$\sqrt{x^2} = \sqrt{3/5}$$

$$\boxed{x = \pm 3/5}$$

$$b) \begin{array}{r} x^2 + 6x + 9 = 2x^2 + 3x + 5 \\ -x^2 \end{array}$$

$$\begin{array}{r} 6x + 9 = x^2 + 3x + 5 \\ -6x \end{array}$$

$$\begin{array}{r} 9 = x^2 - 3x + 5 \\ -9 \end{array}$$

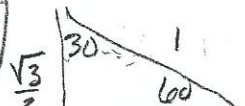
$$0 = x^2 - 3x - 4$$

$$0 = (x-4)(x+1)$$


$$\boxed{\begin{array}{l} x=4 \\ x=-1 \end{array}}$$

7-122) cont'd c)  $8 - \sqrt{9-2x} = x+3$   
 $(-\sqrt{9-2x}) = (x-5)^2$   
 $9-2x = x^2 - 10x + 25$   
 $0 = x^2 - 8x + 16$   
 $0 = (x-4)(x-4)$   
 $x=4$

7-123) a)  $\tan \frac{2\pi}{3} = \frac{\sqrt{3}}{2} \div \frac{1}{2} = \frac{\sqrt{3}}{2} \cdot 2 = \sqrt{3}$



b)  $\tan \frac{7\pi}{6} = \frac{1}{2} \div \frac{\sqrt{3}}{2} = \frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$



$\frac{7\pi}{6} = \frac{1}{2}$

7-124)  $(125, 15)$   
 $(250, 0)$   
 vertex =  $(125, 15)$

$$y = a(x-h)^2 + k$$

$$0 = a(250-125)^2 + 15$$

$$0 = a(125)^2 + 15$$

$$-15 = 15625a$$

$$a = \frac{-15}{15625} = \frac{-3}{3125}$$

$$y = \frac{-3}{3125}(x-125)^2 + 15$$

Thurs. 3/26 (7.2.2 7-129  $\rightarrow$  7-137)

7-129) a)  $y = \sin(x - \frac{\pi}{4}) + 2$

b)  $y = 1.5(\sin^{-\frac{\pi}{2}}) + 0.5$

c)  $y = \sin(x + \frac{5\pi}{6}) + 2$

shifted up 2  
and left  $\frac{5\pi}{6}$

d)  $y = -3\sin(x + \frac{\pi}{3}) - 1$

or  $y = 3\sin(x - \frac{4\pi}{6}) - 1 = 3\sin(x - \frac{2\pi}{3}) - 1$