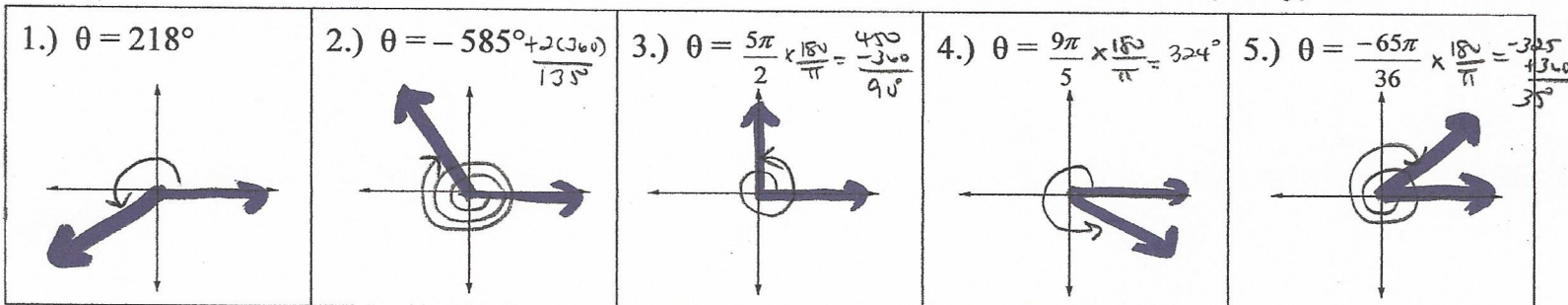
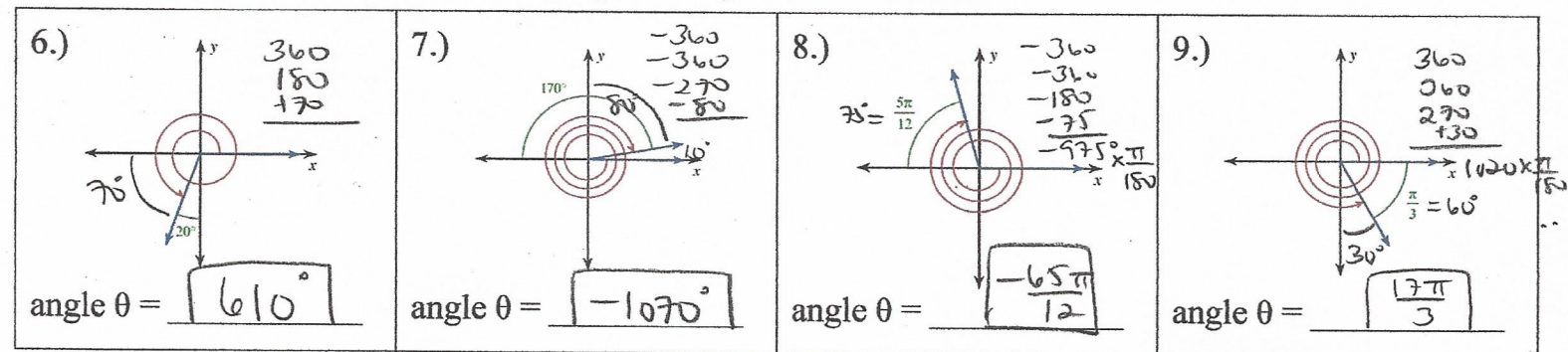


**I. Draw each angle in standard position with a marker. Indicate direction and (if any) swirlies.**



**II. Determine the measure of each angle. Keep units consistent.**

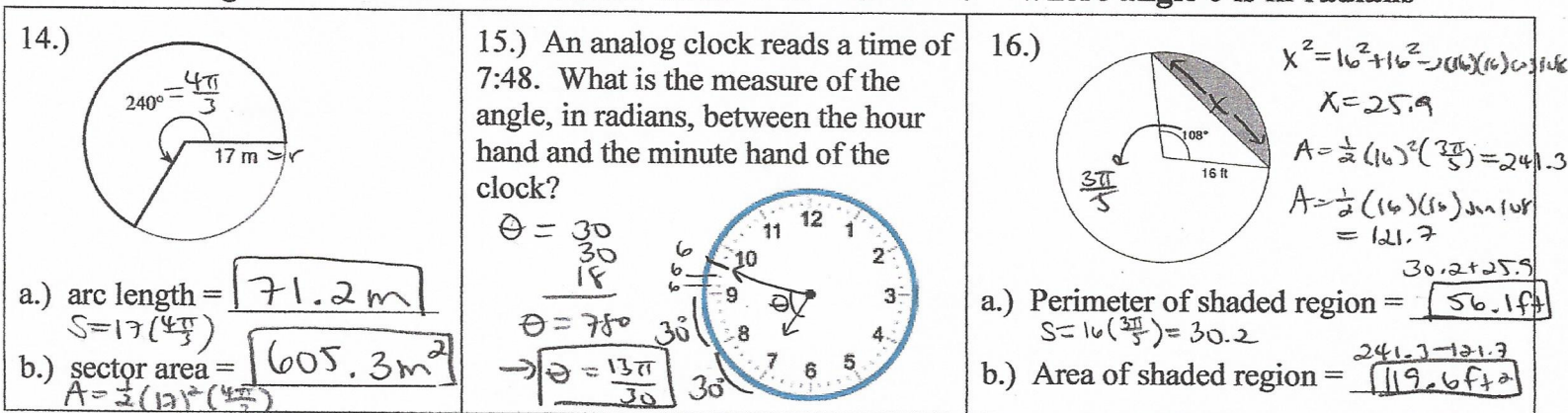


**III. Find the reference angle B given angle  $\theta$ . Make sure angle  $\theta$  is between  $0^\circ$  and  $360^\circ$**

angle $\theta$	Quadrant $\theta$ Lies	Work to find angle B	reference angle B
10.) $322^\circ$	IV (4)	$B = 360 - 322$	$B = 38^\circ$
11.) $128^\circ$	II (2)	$B = 180 - 128$	$B = 52^\circ$
12.) $776^\circ$	I (1)	<del>X</del>	$B = 56^\circ$
13.) $-499^\circ$	III (3)	$B = 221 - 180$	$B = 41^\circ$

**IV. Use appropriate formula to complete each problem below. Round to tenth place. Show work!**

Arc Length  $\rightarrow s = r \cdot \theta$  or Sector Area  $\rightarrow A = \frac{1}{2} \cdot r^2 \cdot \theta$  where angle  $\theta$  is in radians



**V. Find the exact value of each function. Remember – NO decimals!**

17.)  $\sin 300^\circ = -\frac{\sqrt{3}}{2}$  18.)  $\tan 210^\circ = \frac{\sqrt{3}}{3}$  19.)  $\cos 225^\circ = -\frac{\sqrt{2}}{2}$  20.)  $\sin 540^\circ = 0$

21.)  $\tan \left( \frac{7\pi}{2} \right) = 0$  22.)  $\cos \left( \frac{11\pi}{6} \right) = \frac{\sqrt{3}}{2}$  23.)  $\sin \left( -\frac{17\pi}{6} \right) = -\frac{1}{2}$  24.)  $\tan \left( -\frac{2\pi}{3} \right) = -\sqrt{3}$



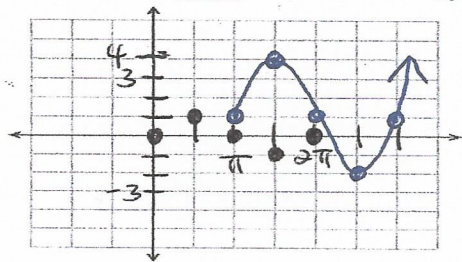
Key Control

## VI Find the missing information and graph the given function. Graph MUST be ACCURATE!!!

25.) Given Function:  $y = 3\sin(x - \pi) + 1$

amplitude =  $|3| = 3$  period =  $\frac{2\pi}{1} = 2\pi$

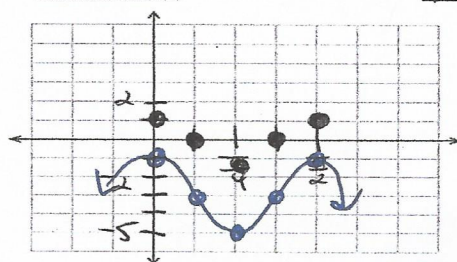
ph. shift =  $\frac{\pi}{1} = \pi$  (right  $\frac{\pi}{1}$ ) vert. shift =  $\boxed{\text{up } 1}$



26.) Given Function:  $y = 2\cos(4x) - 3$

amplitude =  $|2| = 2$  period =  $\frac{2\pi}{4} = \frac{\pi}{2}$

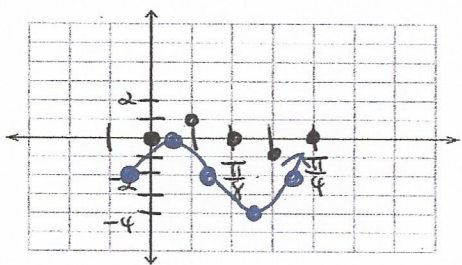
ph. shift = none vert. shift =  $\boxed{\text{down } 3}$



27.) Given Function:  $y = 2\sin\left(8x + \frac{\pi}{4}\right) - 2$

amplitude =  $|2| = 2$  period =  $\frac{2\pi}{8} = \frac{\pi}{4}$

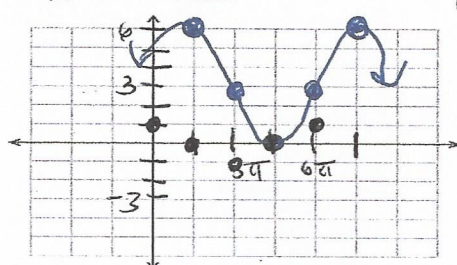
ph. shift =  $-\frac{\pi}{8} = -\frac{\pi}{32}$  (left  $\frac{\pi}{32}$ ) vert. shift =  $\boxed{\text{down } 2}$



28.) Given Function:  $y = 3\cos\left(\frac{1}{3}x - \frac{\pi}{2}\right) + 3$

amplitude =  $|3| = 3$  period =  $\frac{2\pi}{1/3} = 6\pi$

ph. shift =  $\frac{\pi}{3} = \frac{3\pi}{9}$  (right  $\frac{3\pi}{9}$ ) vert. shift =  $\boxed{\text{up } 3}$



## VII. Find the missing information of each given graph to write the function's equation. Show work!

Given/Missing Information	Work to Find a, b, c, and d	Equation for Function
<p>29.)</p> <p><math>y = \cos x</math> amp = 2 period = <math>8\pi</math> ps shift = right <math>4\pi</math> up 2</p>	<p><math>a = 2</math> <math>b = \frac{2\pi}{8\pi} = \frac{1}{4}</math> <math>c = -\frac{1}{4} \cdot 4\pi = -\pi</math> <math>d = 2</math></p>	<p><math>y = 2\cos\left(\frac{1}{4}x - \pi\right) + 2</math></p>
<p>30.)</p> <p><math>y = \sin x</math> amp = 4 period = <math>\pi</math> ps shift = left <math>\frac{\pi}{4}</math> down 1</p>	<p><math>a = 4</math> <math>b = \frac{2\pi}{\pi} = 2</math> <math>c = -2 \cdot -\frac{\pi}{4} = \frac{\pi}{2}</math> <math>d = -1</math></p>	<p><math>y = 4\sin\left(2x + \frac{\pi}{2}\right) - 1</math></p>

## VIII. Complete each word problem below. Must show work!

31.) The monthly sales  $S$  (in thousands of units) of lawn mowers are approximated by the  $S = 74.50 - 43.75\cos(30^\circ t)$  where  $t$  is the time (in months), with  $t = 1$  corresponding to January 1. What is the first month in which sales equal 100,000 units?

$100 = 74.50 - 43.75\cos(30^\circ t)$   
 $25.5 = -43.75\cos(30^\circ t)$   
 $\cos^{-1}\left(\frac{-102}{175} = \cos(30^\circ t)\right)$   
 $125.7 = 30^\circ t$   
 $t = 4.1$   
 $= \boxed{\text{April}}$

32.) A batted baseball leaves the bat at an angle of  $\theta$  with the horizontal and an initial velocity of  $v_0 = 100$  feet per second. The ball is caught by an outfielder 300 feet from the home plate. The range  $r$  of a projectile is given by  $r = \frac{1}{32}v_0^2 \sin(2\theta)$ . What is the value of the angle of the bat from the ground?

$300 = \frac{1}{32}(100)^2 \sin(2\theta)$   
 $9600 = 10000 \sin(2\theta)$   
 $0.96 = \sin(2\theta)$   
 $73.7 = 2\theta$   
 $\theta = 36.9^\circ$