# Quiz # 7

Please show all of your work for maximum credit. Good Luck!!!

1. (2 points) A ferris wheel is 26 meters in diameter, and must be boarded from a platform that is 1.5 meters above the ground. The wheel makes one complete revolution every 6 minutes. At the initial time $t = 0$, you are in the 12:00 position. If h(t) gives your height above ground level t minutes after the initial time, what is the midline and the amplitude?

Sol.
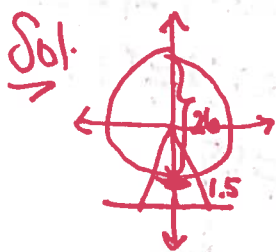
Midline: $\dfrac{27.5+1.5}{2} = \dfrac{29}{2} = 14.5$

$\boxed{y = 14.5}$

Amplitude: $|27.5 - 14.5| = \boxed{13}$

2. (2 points) Point A lies on a circle of radius 2.5 at angle $162°$. Point B lies on a circle of radius 3 at angle $171°$. If both circles are centered at the origin, which point has the least y-value? Show your work by calculating those y-values in supporting your conclusion.

Sol. Point A: $y = r\sin\theta = 2.5\sin 162° = 0.773$

Point B: $y = r\sin\theta = 3\sin 171° = 0.469$

$\boxed{\text{Point B has the least y-value}}$

3. (2 points) An ant starts at the point (1,0) on the unit circle and walks counterclockwise a distance of 2 units around the circle. Find the x- and y-coordinates of the final location of the ant. (Round your answer to 3 decimal places)

Sol $P(x,y)$ $T \approx 1.57$

2 units.

(1,0)

$3.14 \approx \pi$
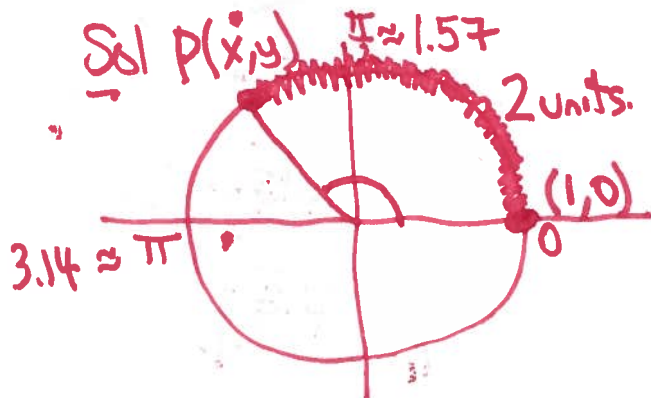
$S = r\cdot\theta$

$2 = (1)(\theta)$

$\boxed{\theta = 2 \text{ radians}}$

Point P:

$x = r\cos\theta = \cos 2$

$y = r\sin\theta = \sin 2$

$\boxed{= (-0.416,\ 0.909)}$

4. (4 points) Graph the given sinusoidal function over two full periods. make sure to label the axis and show all the necessary steps in obtaining the graph. Also, state the period, the amplitude, the midline and the horizontal shift.

$$y = -2\cos\left(3t - \frac{\pi}{4}\right)$$

Sol.
$$y = -2\cos\left(3\left(t - \frac{\pi}{12}\right)\right)$$

(i) starting point = H.S. $\Rightarrow \frac{\pi}{12}$ units to the right.

(ii) Increments: $\dfrac{P}{4} = \dfrac{\frac{2\pi}{3}}{4} = \dfrac{2\pi}{3} \cdot \dfrac{1}{4} = \boxed{\dfrac{2\pi}{12}} = \dfrac{\pi}{6}$

(iii)

t	y
$\frac{\pi}{12}$	$1(-2) = -2$
$\frac{\pi}{12} + \frac{\pi}{12} = \frac{3\pi}{12}$	$0(-2) = 0$
$\frac{5\pi}{12}$	$-1(-2) = 2$
$\frac{7\pi}{12}$	$0(-2) = 0$
$\frac{9\pi}{12}$	$1(-2) = -2$

(i) Period: $P = \dfrac{2\pi}{B} = \boxed{\dfrac{2\pi}{3}}$

(ii) Amplitude $= |-2| = \boxed{2}$

(iii) Midline: $y = 0$

(iv) H.S. $= \dfrac{\pi}{12}$ units to the right