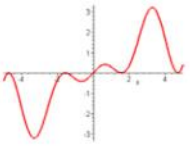
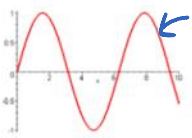
1. What type of function is graphed on the right?



a) an odd function
b) an even function
c) It is both even and odd
d) none of these

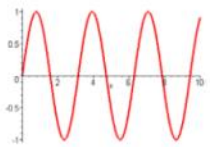
2. Let the following picture be the graph of a function $y = f(x)$



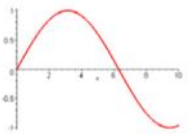
$f(x) = \sin t$
$\sin 2t$
$P = \frac{2\pi}{2} = \pi$

Which of the following represents $y = f(2x)$?

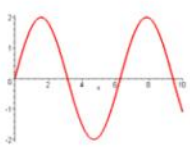
a)



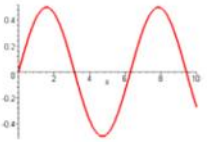
b)



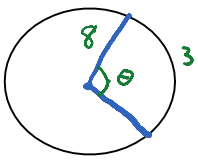
c)



d)

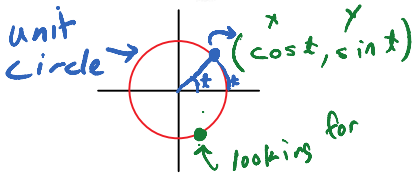


3. Find the measure in radians of the central angle of a circle with radius 8 feet subtended by an arc of length 3 feet.



$\theta = \frac{s}{r}$
$= \frac{3}{8}$

4. Find the exact coordinates (no decimals) of the point on the unit circle determined by the real number $t = \frac{5\pi}{3}$. (**Hint**: in the language of your text book, this is the same as finding $W\left(\frac{5\pi}{3}\right)$.)



So for $t = \frac{5\pi}{3}$ work

$x = \cos\frac{5\pi}{3}$, $y = \sin\frac{5\pi}{3}$
$= \frac{1}{2}$ / $y = -\frac{\sqrt{3}}{2}$

So, $W\left(\frac{5\pi}{3}\right) = \left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ answer

5. Find the exact value (no decimals) of the following: $2\cos 120° - \sec 45° \tan 240°$.

$-\frac{1}{2}$ $\frac{1}{\frac{1}{\sqrt{2}}}$

$2\left(-\frac{1}{2}\right) - \sqrt{2}\cdot\sqrt{3}$
$-1 - \sqrt{6}$

6. Consider the function $y = \tan\left(\frac{1}{2}x - \frac{\pi}{4}\right) = \tan\left[\frac{1}{2}\left(x - \frac{\pi}{2}\right)\right]$

$2 \cdot \frac{\pi}{4} = \frac{\pi}{2}$

a) State the **period**.

π

6. Consider the function $y = \tan\left(\frac{1}{2}x - \frac{\pi}{4}\right)$. $= \tan\left[\frac{1}{2}\left(x - \frac{\pi}{2}\right)\right]$

a) State the **period**.

$P = \frac{\pi}{\frac{1}{2}} = 2\pi$

b) State the phase shift.

$+\frac{\pi}{2}$ (right $\frac{\pi}{2}$)

7. Consider the function $y = -2\cos(\pi x + \frac{1}{2}\pi)$. $= -2\cos\left[\pi\left(x + \frac{1}{2}\right)\right]$

helper: $y = -2\cos(\pi x)$

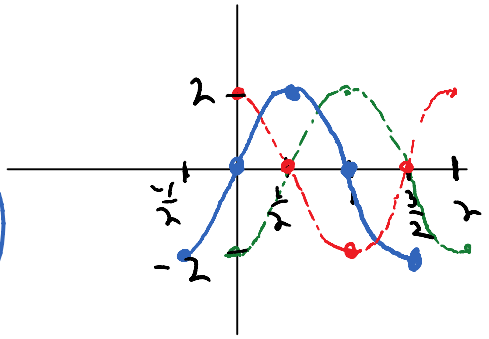
a) Find the **amplitude, period** and **phase shift.**

Amp $= |-2| = 2$, $P = \frac{2\pi}{\pi} = 2$, P.S. $= -\frac{1}{2}$ (left $\frac{1}{2}$)

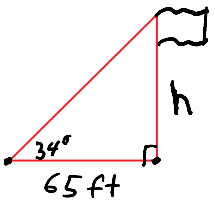
b) Graph one period of the function. Label the intercepts, the highest point(s), and the lowest point(s) on the graph.

Solid blue graph is

$y = -2\cos\left(\pi x + \frac{1}{2}\pi\right)$



8. The measure of the angle of elevation from a position 65 feet from the base of a flagpole to the top of the flagpole is 34°. Find the height of the flagpole to the nearest foot. (**Hint**: draw a picture)



$\tan 34^\circ = \frac{h}{65}$

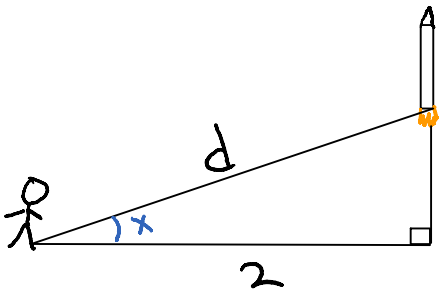
$h = 65\tan 34^\circ$ ft

9. An observer is 2 miles from the launch pad of a rocket. The rocket is launched upward, and the angle of elevation between the observer and the rocket is called x. Write the distance d, in miles, from the observer to the rocket as a trigonometric function of x. (**Hint**: draw a picture)

$\cos x = \frac{2}{d}$

$d = \frac{2}{\cos x}$

$d = 2\sec x$



10. Verify the following identities.

a) $(\tan x + 1)^2 = \sec^2 x + 2\tan x$

b) $1 - \tan^2 x = \frac{\cos 2x}{\cos^2 x}$

$$(\tan x+1)^2 = \tan^2 x+2\tan x+1$$

$$= (\tan^2 x+1)+2\tan x$$

$$= \sec^2 x+2\tan x$$

Done

$$\frac{\cos 2x}{\cos^2 x} = \frac{\cos(x+x)}{\cos^2 x}$$

$$= \frac{\cos x\cos x-\sin x\sin x}{\cos^2 x}$$

$$= \frac{\cos^2 x-\sin^2 x}{\cos^2 x}$$

$$= \frac{\cos^2 x}{\cos^2 x}-\frac{\sin^2 x}{\cos^2 x}$$

$$= 1-\tan^2 x$$

Done

11. Find the exact value of the following without using your calculator: $\cos(330°+45°)$

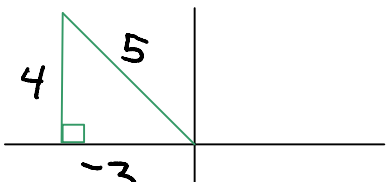
$$\cos(330^\circ+45^\circ) = \cos 330^\circ\cos 45^\circ-\sin 330^\circ\sin 45^\circ$$

$$= \frac{\sqrt{3}}{2}\left(\frac{\sqrt{2}}{2}\right)-\left(-\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right)$$

$$= \frac{\sqrt{6}}{4}+\frac{\sqrt{2}}{4}$$

$$= \frac{\sqrt{6}+\sqrt{2}}{4}$$

12. Given $\sin\theta=\frac{4}{5}$, for θ in quadrant 2, find ~~$\sin 2\theta$~~ $2\sin\theta\cos\theta$.



$$2\sin\theta\cos\theta$$

$$= 2\left(\frac{4}{5}\right)\left(\frac{-3}{5}\right) = -\frac{24}{25}$$

13. Find the arc length associated with a central angle of 45 degrees and a radius of 48 inches.

$\frac{\pi}{4}$

$s = r\theta$

$s = 48 \cdot \frac{\pi}{4} = 12\pi$ inches