

# Test Review: Intro to Trig

Directions: SHOW ALL WORK unless indicated otherwise.

1. Conversions - Convert to either radians or degrees. Exact answers only!

a.)  $350^\circ = \frac{35\pi}{18}$       b.)  $\frac{5\pi}{12} = 75^\circ$       c.)  $-2/5 = -\frac{72}{\pi}$       d.)  $-400^\circ = -\frac{20\pi}{9}$

2. Find a positive and negative coterminal angle for the following.

a.)  $-20^\circ \rightarrow 340^\circ$   
 $\rightarrow -380^\circ$

b.)  $\frac{5\pi}{12} \rightarrow \frac{29\pi}{12}$   
 $\rightarrow -19\pi/12$

3. Using the unit circle, find the exact value of the six trig functions of the given angles.

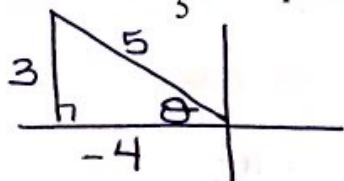
a.)  $\frac{\pi}{4}$        $\sin\theta = \frac{\sqrt{2}}{2}$        $\csc\theta = \sqrt{2}$   
 $\cos\theta = \frac{\sqrt{2}}{2}$        $\sec\theta = \sqrt{2}$   
 $\tan\theta = 1$        $\cot\theta = 1$

b.)  $\frac{-\pi}{2}$        $\sin\theta = -1$        $\csc\theta = -1$   
 $\cos\theta = 0$        $\sec\theta = \text{undef}$   
 $\tan\theta = \text{undef}$        $\cot\theta = 0$

c.)  $\frac{5\pi}{3}$        $\sin\theta = -\frac{\sqrt{3}}{2}$        $\csc\theta = -\frac{2\sqrt{3}}{3}$   
 $\cos\theta = \frac{1}{2}$        $\sec\theta = 2$   
 $\tan\theta = -\sqrt{3}$        $\cot\theta = -\frac{\sqrt{3}}{3}$

4. Find the value of the remaining trig functions using the given information.

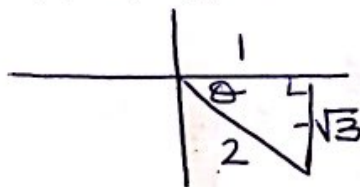
a.)  $\sin(\theta) = \frac{3}{5}$ ,  $\theta$  in quadrant II



$\cos\theta = -4/5$   
 $\tan\theta = -3/4$

$\csc\theta = 5/3$   
 $\sec\theta = -5/4$   
 $\cot\theta = -4/3$

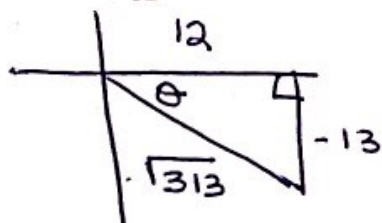
b.)  $\sec(\theta) = 2$ ,  $\sin(\theta) < 0$



$\sin\theta = -\frac{\sqrt{3}}{2}$   
 $\cos\theta = \frac{1}{2}$   
 $\tan\theta = -\sqrt{3}$

$\csc\theta = -\frac{2\sqrt{3}}{3}$   
 $\sec\theta = 2$   
 $\cot\theta = -\frac{\sqrt{3}}{2}$

c.)  $\tan\theta = \frac{-13}{12}$ ,  $\sin(\theta) < 0$



$\sin\theta = \frac{-13\sqrt{313}}{313}$   
 $\cos\theta = \frac{12\sqrt{313}}{313}$   
 $\tan\theta = -\frac{13}{12}$

$\csc\theta = \frac{\sqrt{313}}{13}$   
 $\sec\theta = \frac{\sqrt{313}}{12}$   
 $\cot\theta = -\frac{12}{13}$

5. Evaluate the following expressions using the unit circle.

a.)  $\sin\left(-\frac{\pi}{3}\right)$

$-\frac{\sqrt{3}}{2}$

b.)  $\cos\left(-\frac{\pi}{4}\right)$

$\frac{\sqrt{2}}{2}$

c.)  $\csc\left(-\frac{\pi}{4}\right)$

$-\sqrt{2}$

d.)  $\cot\left(-\frac{13\pi}{3}\right) =$

$-\frac{\sqrt{3}}{3}$

e.)  $\cos\left(\frac{\pi}{4}\right) + \sin\left(\frac{\pi}{3}\right)$

$\frac{\sqrt{2} + \sqrt{3}}{2}$

f.)  $4\cos(60^\circ) + 3\tan\left(\frac{\pi}{3}\right)$

$2 + 3\sqrt{3}$

g.)  $4\cos(30^\circ) + 3\tan\left(\frac{\pi}{6}\right)$

$3\sqrt{3}$

h.)  $\sec\left(-\frac{\pi}{3}\right) + \cot\left(-\frac{5\pi}{4}\right) =$

$1$

6. Find the value of the inverse trig functions.

a.)  $\sin^{-1}\frac{\sqrt{2}}{2}$

$\frac{\pi}{4}$

b.)  $\cos^{-1} 1$

$0$

c.)  $\tan^{-1}\left(\frac{\sin\left(-\frac{\pi}{2}\right)}{-1}\right) = -\frac{\pi}{4}$

d.)  $\tan^{-1} -\sqrt{3}$

$-\frac{\pi}{3}$

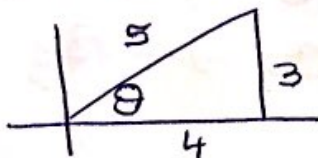
e.)  $\sec^{-1} 2$

$\frac{\pi}{3}$

f.)  $\sin^{-1}(\sec \pi) = -\frac{\pi}{2}$

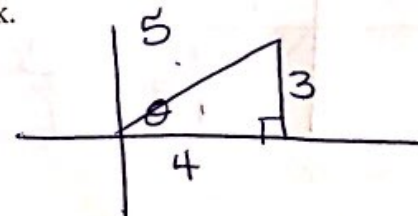
7. Evaluate each of the following. Draw a triangle to show your work.

a.)  $\cos(\tan^{-1}\frac{3}{4})$



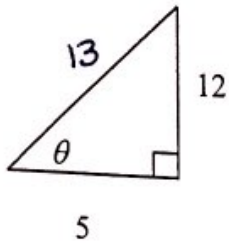
$= \frac{4}{5}$

b.)  $\sin(\sec^{-1}\frac{5}{4})$



$= \frac{3}{5}$

8. Find the exact value of the six trigonometric function of the angle in the triangle.



$$\sin \theta = \frac{12}{13}$$

$$\csc \theta = \frac{13}{12}$$

$$\cos \theta = \frac{5}{13}$$

$$\sec \theta = \frac{13}{5}$$

$$\tan \theta = \frac{12}{5}$$

$$\cot \theta = \frac{5}{12}$$

9. Find the arc length and sector area of the following. Find exact and approximate values to 2 decimal places.

Exact a.  $r = 9$  inches,  $\theta = 25^\circ$  Approximate

$$S = \frac{5\pi}{4} \text{ in}$$

$$S \approx 3.93 \text{ in}$$

$$K = \frac{45\pi}{8} \text{ in}^2$$

$$K \approx 17.67 \text{ in}^2$$

b. diameter = 28 ft,  $\theta = 112^\circ$

$$S = \frac{392\pi}{45} \text{ ft}$$

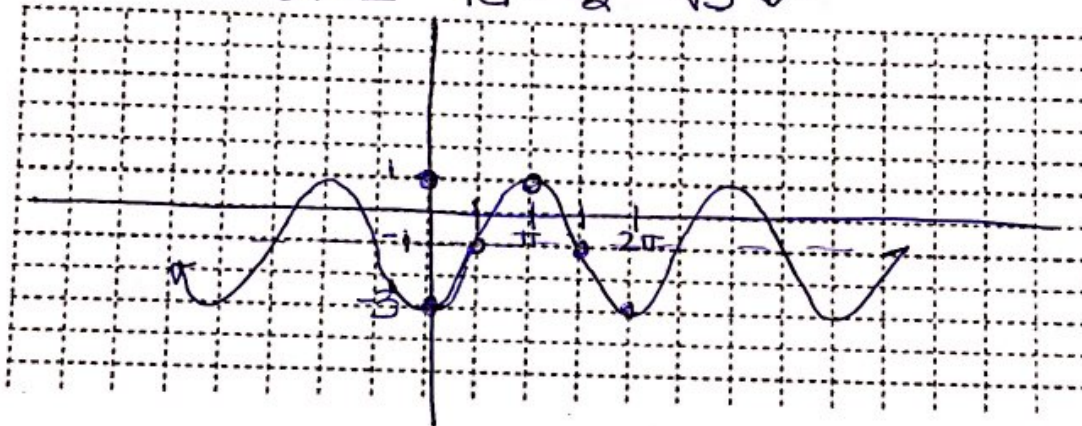
$$K = \frac{2744\pi}{45} \text{ ft}^2$$

$$S \approx 27.37 \text{ ft}$$

$$K \approx 191.57 \text{ ft}^2$$

10. Sketch a graph of  $y = -2 \cos(4x) - 1$  without a calculator.

$$a = 2 \quad Pd = \frac{\pi}{2} \quad VS \downarrow$$



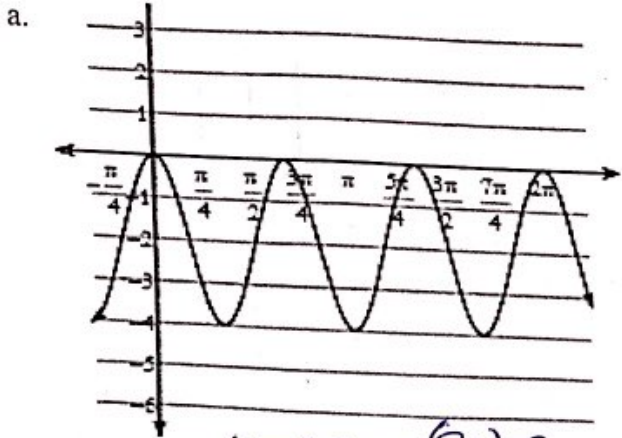
$$4 \sin(2(x - \frac{\pi}{2}))$$

11. Sketch a graph of  $y = 4 \sin(2x - \pi)$  without a calculator.

$$a = 4 \quad Pd = \pi \quad PS \frac{\pi}{2} \text{ right}$$

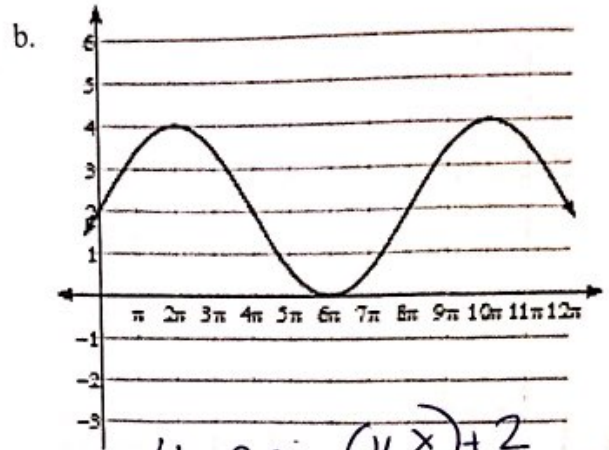


12. Write a sine and cosine equation given the following graphs.



$$y = 2\cos(3x) - 2$$

$$y = 2\sin(3x - \pi/2) - 2$$



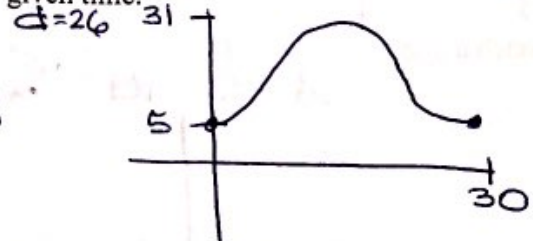
$$y = 2\sin(\frac{1}{4}x) + 2$$

$$y = 2\cos(\frac{1}{4}(x - 2\pi)) + 2$$

13. A Ferris Wheel is 5 feet off the ground. The wheel has a 13 foot radius, and makes a full revolution in 30 seconds. Write a sinusoidal function to model the height at any given time.

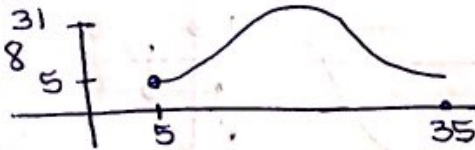
a. Assume at  $t = 0$ , the rider is at the lowest point.

$$y = -13\cos(\frac{\pi}{15}x) + 18$$



b. Assume the rider is at the lowest point after 5 seconds.

$$y = -13\cos[\frac{\pi}{15}(x - 5)] + 18$$



14. Find the amplitude, period, frequency, and any shifts for the following functions.

a.  $y = -1/4\cos(5x) - 3$

$A = 1/4$        $\downarrow 3$   
 $P = 2\pi/5$   
 $f = 5/2\pi$

b.  $y = 3\sin(4x - \pi)$

$a = 3$       Right  $\pi/4$   
 $P = \pi/2$   
 $f = 2/\pi$

c.  $y = 1/2\sin(3x + \pi/2) + 1$

$a = 1/2$       left  $\pi/6$   
 $P = 2\pi/3$       up 1  
 $f = 3/2\pi$

d.  $y = -5\cos(\frac{\theta}{4}) - 1$

$a = 5$        $\downarrow 1$   
 $P = 8\pi$   
 $f = 1/8\pi$

e.  $y = 2\tan(3x)$

$a = \text{none}$   
 $P = \pi/3$

\*Make sure you know all parent function graphs!\*