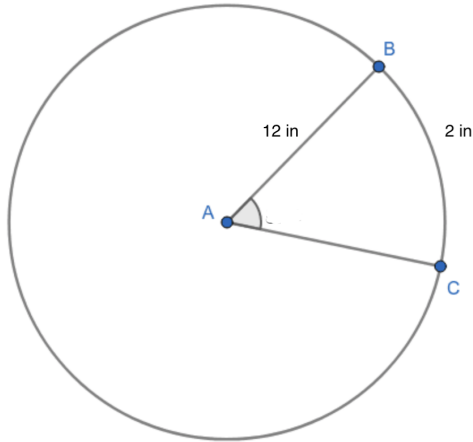


Calculus & Trigonometry

Chapter 4 & 5 Pre-Test

1.) (10 pts total, 5 pts each) Find the measure of the indicated arc or angle.

a) Find  $m\angle BAC$



b) Find arc BC

$\theta = \frac{\text{arc length}}{2\pi r}$   
 ← radians or  
 $\theta r = \text{arc length}$   
 $\frac{48^\circ}{360^\circ} \times \frac{a}{2\pi(32)}$   
 $\frac{(a)(360^\circ)}{360^\circ} = \frac{(48^\circ)(2\pi)(32)}{360^\circ}$   
 $\frac{4}{12} \div 12$   
 $\frac{(48)(2\pi)(32)}{360} \div 12$   
 $\frac{360}{100} \div 12$   
 $\frac{128\pi}{15}$  or 26.8 cm

2.) (10 pts total, 2.5 pts each) Convert each angle measure as indicated.

a)  $225^\circ = \underline{\hspace{2cm}} \pi$

b)  $7\pi/6 = \underline{\hspace{2cm}}^\circ$

$$580^\circ * \frac{\pi}{180^\circ} = \frac{580\pi}{180 \div 20} = \boxed{\frac{29\pi}{9}}$$

c)  $580^\circ = \frac{29\pi}{9}$

d)  $11\pi/4 = \underline{495}^\circ$

$$\frac{11\pi}{4} * \frac{180}{\pi} = 495^\circ$$

3.) (10 pts total, 2 pts each) Provide each of the indicated trigonometric ratios.

a)  $\cos A$

b)  $\sec C$

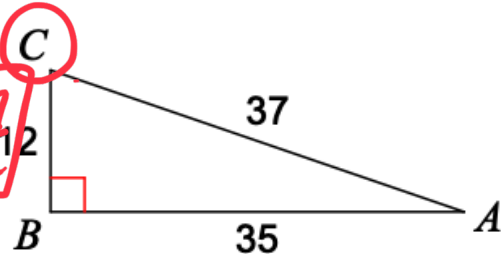
c)  $\csc A$

d)  $\tan C$

e)  $\sin C = \frac{\text{opp}}{\text{hyp}} = \boxed{\frac{35}{37}}$

$\cos \rightarrow \frac{\text{adj}}{\text{hyp}}$

$$\frac{1}{\cos C} = \frac{\text{hyp}}{\text{adj}} = \frac{37}{12}$$

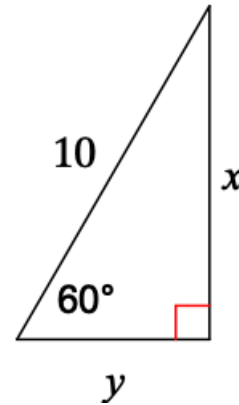


4.) (10 pts total, 2.5 pts each) Solve using special triangles. Please express your answer in radical form.

a)

x =

y =



b)

u =

v =

Handwritten notes for part b:

$45-45-90$

$8 \div \sqrt{2}$

$\frac{8 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{8\sqrt{2}}{2} = 4\sqrt{2}$

u =  $4\sqrt{2}$

v =  $4\sqrt{2}$

Diagram: A right-angled triangle with a hypotenuse of length 8. The angle at the bottom-right vertex is 45 degrees. The legs are labeled 'u' and 'v'. A right-angle symbol is at the top vertex. A red arrow points from the hypotenuse to the legs with the note  $*\sqrt{2}$ .

5.) (20 pts total, 2 pts each) Provide the value of each. Express in radical form if applicable.

a)  $\cos 120^\circ$

b)  $\sin 5\pi/6$

c)  $\tan 7\pi/4$

d)  $\cos 11\pi/6$   $\boxed{\frac{\sqrt{3}}{2}}$

e)  $\csc 270^\circ$

f)  $\sec 3\pi/4$

g)  $\sin 315^\circ$   $\boxed{-\frac{\sqrt{2}}{2}}$

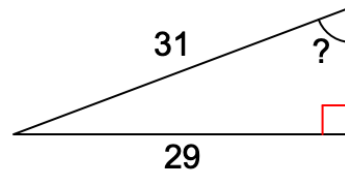
h)  $\cot 30^\circ = \frac{\cos 30^\circ}{\sin 30^\circ} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \boxed{\sqrt{3}}$

i)  $\sec 4\pi/3$

j)  $\cot \pi/2$

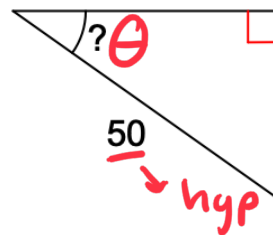
6.) (10 pts total, 2.5 pts each) Solve for the indicated variable.

a)



b)  $\sin \theta = \frac{\text{opp}}{\text{hyp}}$   
 $\sin^{-1} [\sin \theta] = \sin^{-1} \left[ \frac{29}{50} \right]$

~~$\frac{\sin 90^\circ}{50} = \frac{\sin \theta}{29}$~~   $\frac{29}{50} = \frac{50 \sin \theta}{50}$



$\sin \theta = \frac{29}{50}$

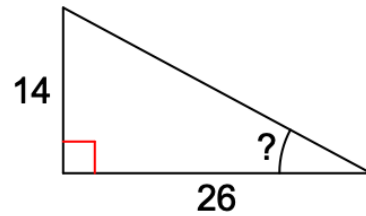
29 → opp

$\theta = \sin^{-1} \left[ \frac{29}{50} \right]$

c)

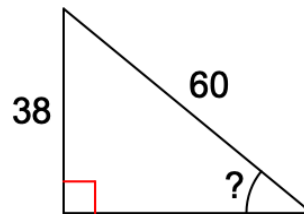
$35.5^\circ$

$\theta = \tan^{-1} \left[ \frac{14}{26} \right]$



d)

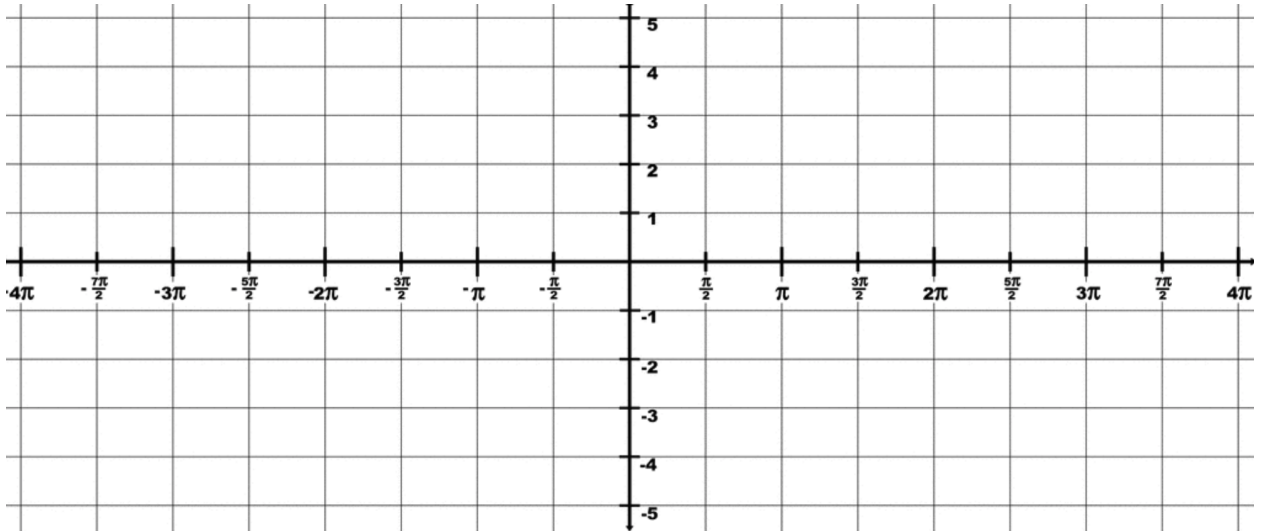
$28.3^\circ$



7.) (10 pts total, 5 pts each)

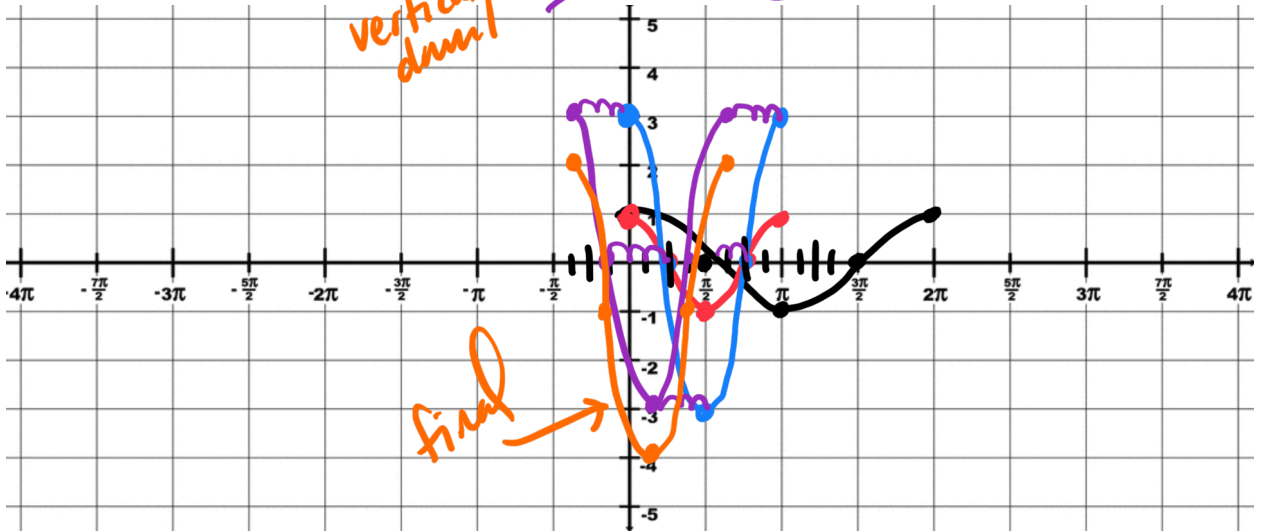
8.) (20 pts total, 10 pts each) Graph each of the following trig functions.

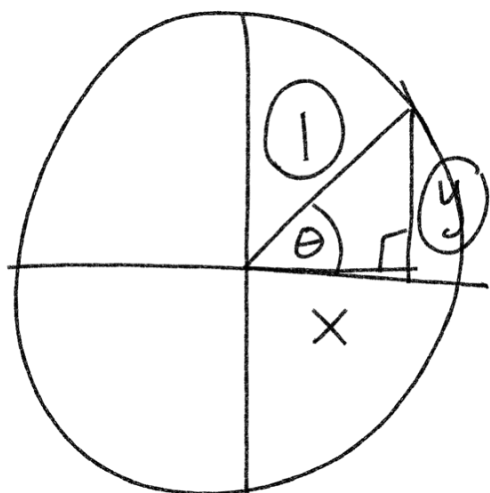
a)  $y = 2\sin(1/2x - \pi/4) + 3$



b)  $y = 3\cos(2x + 3\pi/4) - 1$

$\downarrow$   $\checkmark$   $\downarrow$   $\downarrow$   $\downarrow$   
*Left  $\frac{3\pi}{8}$*   
*period =  $\frac{2\pi}{b} = \frac{2\pi}{2} = \pi$*   
 *$\frac{3\pi/4}{2} = \frac{3\pi}{8}$*   
*vertical shift*





$$\sin \theta = y$$

$$\cos \theta = x$$

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

$$\cos \frac{\pi}{6} = \frac{\sqrt{3}}{2}$$

pythagorean theorem

$$a^2 + b^2 = c^2$$

$$x^2 + y^2 = 1^2$$

$$(\cos \theta)^2 + (\sin \theta)^2 = 1$$

$$\cos^2 \theta + \sin^2 \theta = 1$$

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

$$\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{1}{2} \cdot \frac{1}{2}$$

$$\frac{3}{4} + \frac{1}{4} = 1 \quad \checkmark$$

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\frac{\sin^2 \theta}{\sin^2 \theta} + \frac{\cos^2 \theta}{\sin^2 \theta} = \frac{1}{\sin^2 \theta}$$

↓

$$1 + \cot^2 \theta = \csc^2 \theta$$

$$\frac{\sin^2 \theta}{\cos^2 \theta} + \frac{\cos^2 \theta}{\cos^2 \theta} = \frac{1}{\cos^2 \theta}$$

↓

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$1.) (\cos^2 x)(\tan x)(\sec x) = \sin x$$

$$\frac{(\cancel{\cos^2 x})(\sin x)}{(\cancel{\cos x})(\cancel{\cos x})}$$

$$\sin x = \sin x \quad \checkmark$$

---

$$\tan x \sin x + \cos x = \sec x$$

$$\frac{(\sin x)(\sin x)}{\cos x} + \cos x \frac{(\cos x)}{(\cos x)}$$

$$\frac{\sin^2 x}{\cos x} + \frac{\cos^2 x}{\cos x}$$

$$\frac{\sin^2 x + \cos^2 x}{\cos x}$$

$$\frac{1}{\cos x}$$

$$= \sec x$$