

Key

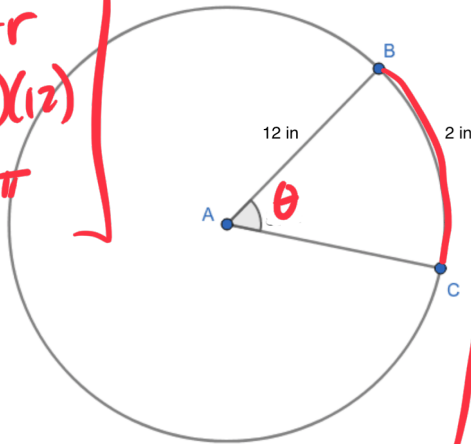
1.) (10 pts total, 5 pts each) Find the measure of the indicated arc or angle.

a) Find $m\angle BAC$

$$C = 2\pi r$$

$$(2\pi)(12)$$

$$24\pi$$



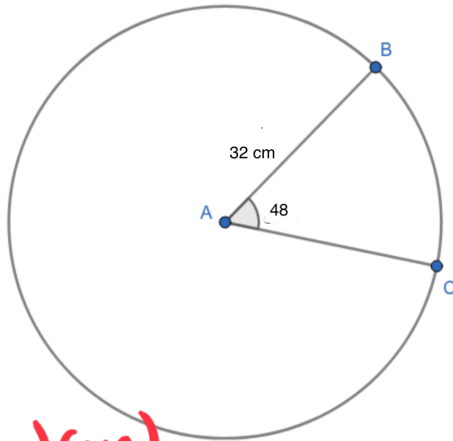
$$\frac{\theta}{360} = \frac{\text{arc length}}{2\pi r}$$

$$\frac{\theta}{360} = \frac{2}{24\pi}$$

$$\frac{24\pi\theta}{24\pi} = \frac{720}{24\pi}$$

$$\theta = \frac{30}{\pi}$$

b) Find arc BC



$$\frac{\theta}{360} = \frac{\text{arc length}}{2\pi r}$$

$$\frac{(2\pi r)(\theta)}{360} = \frac{(360)(\text{arc})}{360}$$

$$\frac{2\pi(32)(48)}{360}$$

$$\frac{180}{15}$$

$$\text{arc} = \frac{(2\pi r)(\theta)}{360} = \frac{2\pi(32\text{cm})(48^\circ)}{360}$$

$$\frac{128\pi}{15} \approx 26.8\text{cm}$$

Reduced

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

a) $225^\circ = \frac{5\pi}{4}$ $225^\circ * \frac{\pi}{180^\circ} = \frac{\pi}{180}$ or $\frac{180}{\pi}$

b) $7\pi/6 = 210^\circ$ $\left[\frac{225\pi}{180} \right] \div 45 = \frac{5\pi}{4}$

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

$7\pi * \frac{180}{\pi} = 210$
 $\div 10, \pi$

d) $11\pi/4 = 495^\circ$
 $580^\circ * \frac{\pi}{180} = \frac{29\pi}{9}$
 $\div 20$

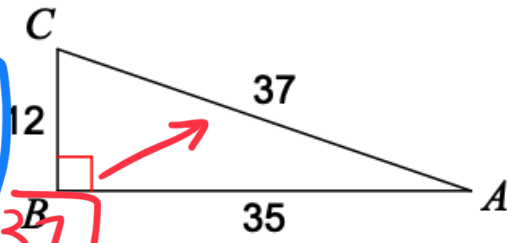
$\frac{11\pi}{4} * \frac{180}{\pi} = 495^\circ$
 $\div 45$

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

a) $\cos A = \frac{\text{adj}}{\text{hyp}} = \frac{35}{37}$

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

c) $\csc A = \frac{1}{\sin A} = \frac{\text{hyp}}{\text{opp}} = \frac{37}{12}$



d) $\tan C = \frac{\text{opp}}{\text{adj}} = \frac{35}{12}$

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

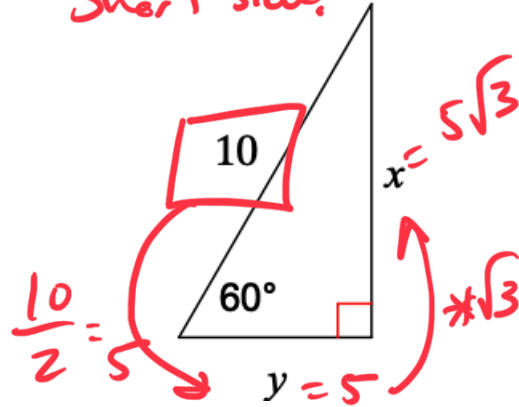
4.) (10 pts total, 2.5 pts each) Solve using special triangles. Please express your answer in radical form.

a)

30-60-90 find the short side.

$x = 5\sqrt{3}$

$y = 5$

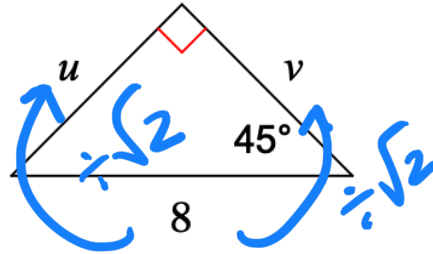


b)

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

$u = 4\sqrt{2}$

$v = 4\sqrt{2}$



NO CALCULATOR

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

a) $\cos 120^\circ = -\frac{1}{2}$

c) $\tan 7\pi/4 = -1$

e) $\csc 270^\circ = -1$

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

b) $\sin 5\pi/6 = \frac{1}{2}$

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

f) $\sec 3\pi/4 = \frac{1}{\cos 3\pi/4} = \frac{1}{-\frac{\sqrt{2}}{2}} = -\frac{2}{\sqrt{2}}$

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

$1 \div \frac{-\sqrt{2}}{2} = 1 * \frac{-2}{\sqrt{2}} = \frac{-2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{-2\sqrt{2}}{2} = -\sqrt{2}$

+1, 0,
+sqrt(2)/2
+1/2
+sqrt(3)/2



i) $\sec 4\pi/3 = \boxed{-2}$
 $\frac{1}{\cos}$

j) $\cot \pi/2 = \boxed{0}$
 $\frac{\cos}{\sin} = \frac{0}{1}$

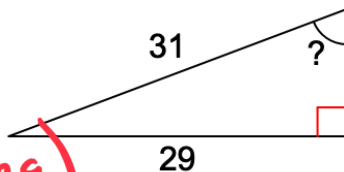
Trig Functions

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

a) $\sin^{-1} \left[\sin \theta \right] = \left[\frac{29}{31} \right]$

$\sin \theta = \frac{\text{opp}}{\text{hyp}}$

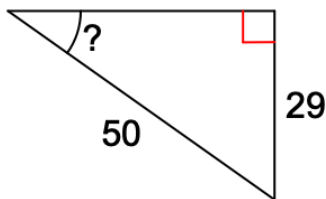
$\theta = \sin^{-1} \left(\frac{29}{31} \right)$



b)

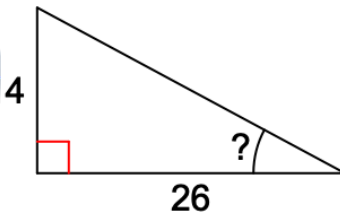
$\boxed{69.3^\circ}$

$\sin^{-1} \left[\frac{29}{50} \right] = \boxed{35.5^\circ}$



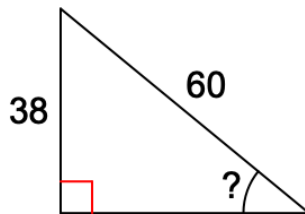
c)

$\tan^{-1} \left[\frac{14}{26} \right] = \boxed{28.3^\circ}$



d)

$\sin^{-1} \left[\frac{38}{60} \right] = \boxed{39.3^\circ}$



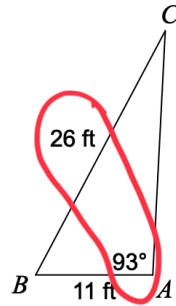
7.) (10 pts total, 5 pts each)

Law of sin/cos

a) Find $m\angle C$. Law of sine

Have a pair!

$$\frac{\sin 93^\circ}{26} = \frac{\sin C}{11}$$



$$\frac{26 \sin C}{26} = \frac{11 \sin 93^\circ}{26} \quad [\sin C] = \left[\frac{11 \sin 93^\circ}{26} \right]$$

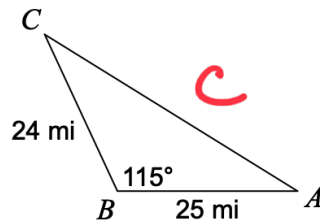
$$C = \sin^{-1} \left[\frac{11 \sin 93^\circ}{26} \right] = \boxed{25^\circ}$$

b) Find AC.

Law of cosine

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$c = \sqrt{a^2 + b^2 - 2ab \cos C}$$



No pair!

$$c = \sqrt{(25)^2 + (24)^2 - 2(25)(24)\cos 115^\circ} = \boxed{41.3 \text{ mi}}$$

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

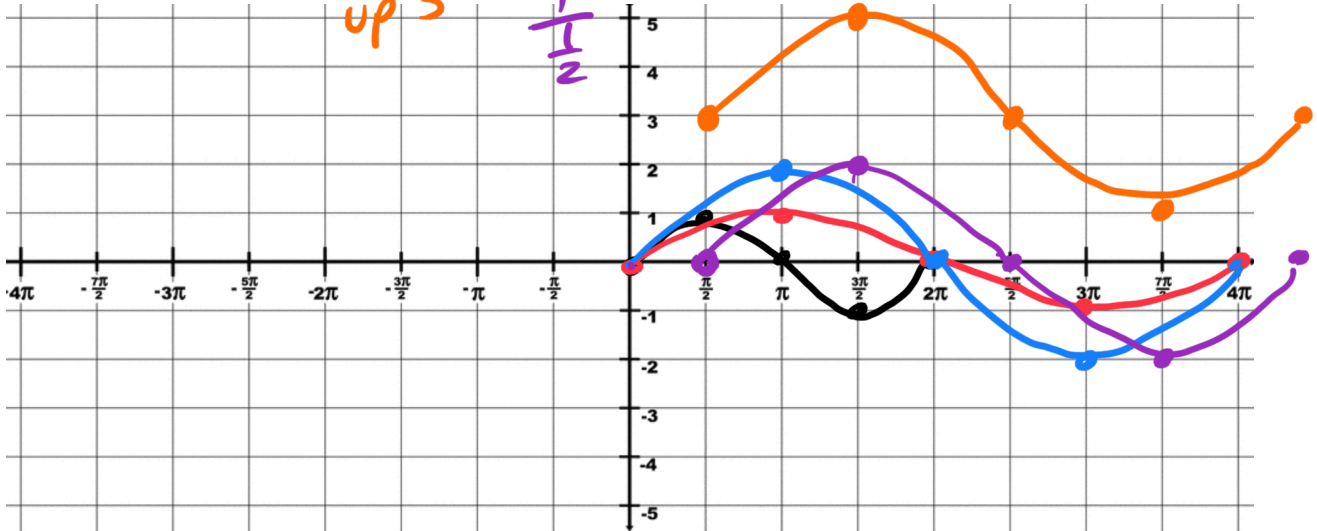
a) $y = 2\sin(1/2x - \pi/4) + 3$

amplitude

$b = 1/2$
up 3

$-\frac{\pi}{4} - \frac{\pi}{4} \times 2 = -\frac{\pi}{2}$
 $\frac{2\pi}{2} \div \frac{1}{2} = 4\pi$

period = $\frac{2\pi}{b} = \frac{2\pi}{1/2}$



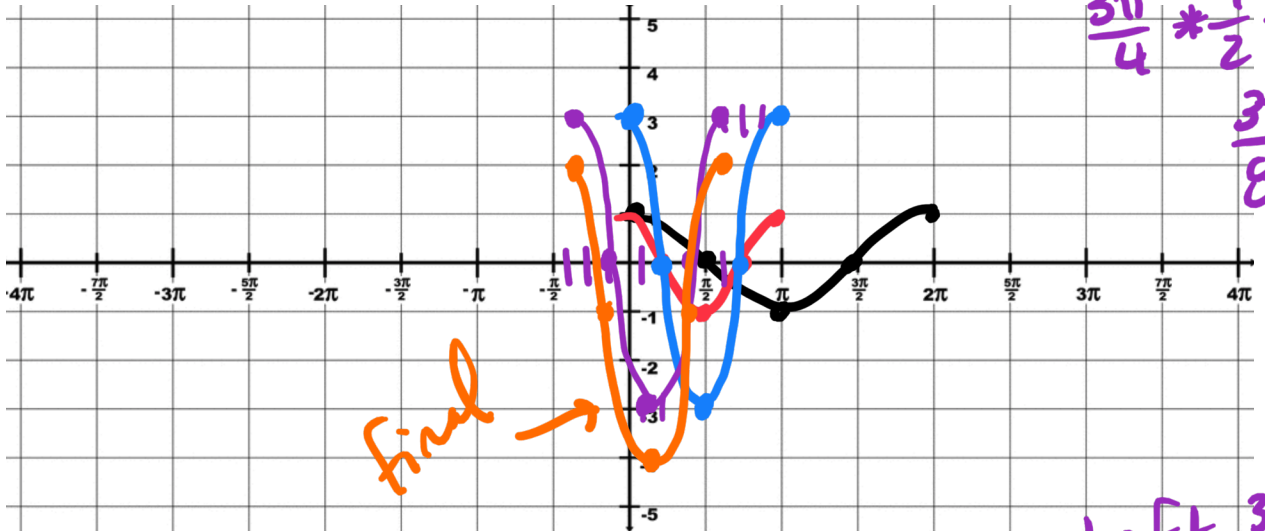
b) $y = 3\cos(2x + 3\pi/4) - 1$

✓ ✓ ✓ ✓ ✓

period = $\frac{2\pi}{b} = \frac{2\pi}{2} = \pi$

$\frac{3\pi}{4} \div 2$

$\frac{3\pi}{4} * \frac{1}{2} = \frac{3\pi}{8}$



final

Left $\frac{3\pi}{8}$