

Honors Precalculus '17-18
Trig Basics
Part I--CALCULATOR ALLOWED

Name SOLUTION KEY

1. $\sin\left(\cos^{-1}\frac{3}{4}\right) =$

a. 0.438

b.

0.661

c. 0.821

d. 1.3238

e. 1.528

2. The magnitude of $\vec{v} = 7\vec{i} - \sqrt{6}\vec{j}$ is

a.

$\sqrt{55}$

b.

1

c.

13

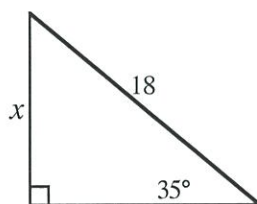
d.

85

e.

$\sqrt{85}$

3. In the triangle shown, which of the following best approximates x ?



a.

10.32

b.

25.71

c.

12.60

d.

14.74

e.

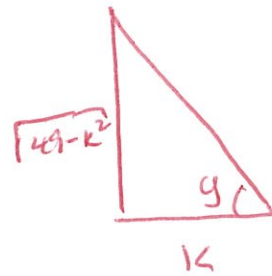
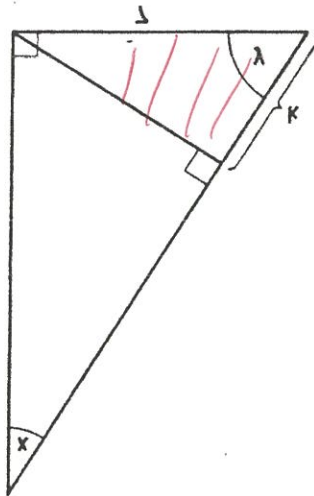
none of these

4. If $f(x,y) = \tan x + \tan y$ and $g(x,y) = 1 - \tan x \cdot \tan y$, then, in radians, $\frac{g(2,1)}{f(2,1)} =$

- a. -7.02 ~~b. -0.14~~ c. 0
 d. 0.957 e. 9.971

$$\frac{1 - \tan 2 \tan 1}{\tan 2 + \tan 1}$$

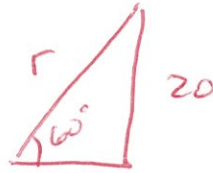
5. In the figure below, $\tan y =$



- a. $\frac{7}{k}$ b. $\frac{k}{7}$ c. $\frac{7-k}{7}$ d. $\frac{\sqrt{49-k^2}}{7}$ e. $\frac{\sqrt{49-k^2}}{k}$

6. An incline makes an angle of 60° with level ground. How many feet up the incline must one go in order to rise 20 feet above the ground?

- a. 10 b. $10\sqrt{3}$ c. $\frac{20}{\sqrt{3}}$ d. 40 e. $40\sqrt{3}$



$$r = \frac{20}{\sin 60} = \frac{20}{\sqrt{3}/2} = \frac{40}{\sqrt{3}}$$

7. What is the measure of an angle whose sine is twice the cosine of 60° ?

- a. 30° b. 60° c. 90°
d. 120° e. No such angle

$$\cos 60 = \frac{1}{2}$$

$$\sin 2x = \sin \theta = 1$$

1. $(12, -13)$ is on the terminal side of A . Find the six exact trig values:

$$\sin A = \frac{-13}{\sqrt{313}}$$

$$\csc A = \frac{-\sqrt{313}}{13}$$

$$\cos A = \frac{12}{\sqrt{313}}$$

$$\sec A = \frac{\sqrt{313}}{12}$$

$$\tan A = \frac{-13}{12}$$

$$\cot A = \frac{-12}{13}$$

2. If $\cos B = -\frac{5}{8}$ in QII, find the other five exact trig values:

$$\sin B = \frac{\sqrt{39}}{8}$$

$$\csc B = \frac{8}{\sqrt{39}}$$

$$\cos B = -\frac{5}{8}$$

$$\sec B = -\frac{8}{5}$$

$$\tan B = \frac{-\sqrt{39}}{5}$$

$$\cot B = \frac{-5}{\sqrt{39}}$$

3. What are the approximate values, in degrees of A and B (from #1 and #2)?

$$A = \underline{-47.291 \pm 360^\circ}$$

$$B = \underline{128.682 \pm 360^\circ}$$

4. (a) Find the approximate values of:

$$\cos -28 = .963$$

$$\sin -136^\circ = -.695$$

$$\tan 2.34 = -1.033$$

$$\sec -.717 = 1.327$$

$$\csc 15.29^\circ = 3.792$$

$$\cot 2 = -.458$$

(b) Find the approximate values (in degrees) of:

$$\cos^{-1} 1.705 = \left\{ \begin{array}{l} \text{NO SOLUTION} \end{array} \right.$$

$$\sin^{-1} (-0.516) = \left\{ \begin{array}{l} -31.064^\circ \pm 360^\circ n \\ 211.064^\circ \pm 360^\circ n \end{array} \right.$$

$$\tan^{-1} 0.758 = \left\{ \begin{array}{l} 37.162^\circ \pm 180^\circ n \end{array} \right.$$

$$\sec^{-1} 2.982 = \left\{ \begin{array}{l} \pm 70.406^\circ \pm 360^\circ n \end{array} \right.$$

$$\csc^{-1} -1.362 = \left\{ \begin{array}{l} -47.241^\circ \pm 360^\circ n \\ 227.241^\circ \pm 360^\circ n \end{array} \right.$$

5. A boat sails 48 mph at a bearing of 303° . The current flows 8 mph at 34° . Find the magnitude and bearing of the resultant vector.

$$\begin{aligned} & 48 \cos 303^\circ \vec{i} + 48 \sin 303^\circ \vec{j} \\ & 8 \cos 34^\circ \vec{i} + 8 \sin 34^\circ \vec{j} \\ \hline & 32.775 \vec{i} - 35.783 \vec{j} \end{aligned}$$

$$\begin{aligned} |\vec{r}| &= \sqrt{32.775^2 + 35.783^2} \\ &= 48.524 \text{ mph} \end{aligned}$$

$$\theta = -\cos^{-1}\left(\frac{32.775}{48.524}\right) = -47.512$$

6. Identify the quadrant and reference angle of :

a) 732° Q I $\theta_{ref} = 12^\circ$

b) -932° Q II $\theta_{ref} = 32^\circ$

c) 1345° Q III $\theta_{ref} = 85^\circ$

d) -632° Q I $\theta_{ref} = 88^\circ$

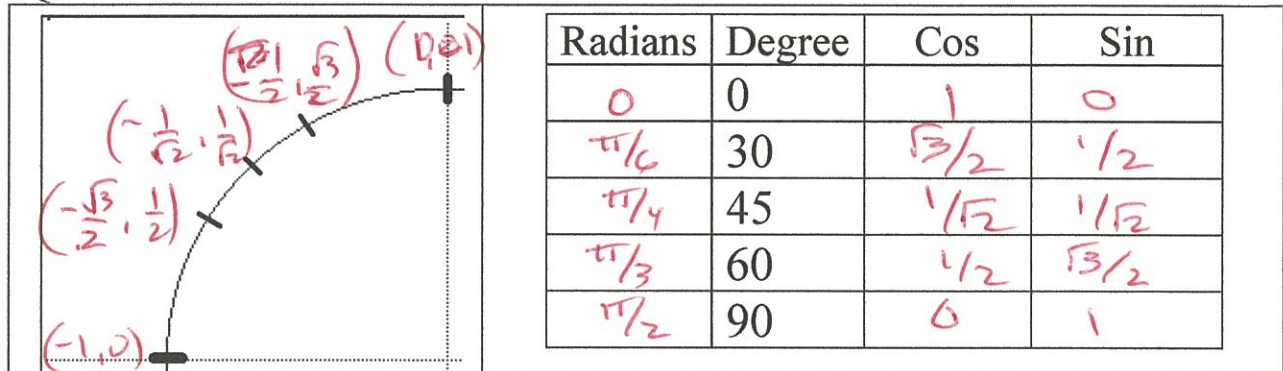
Trig Basics

Part III

NO CALCULATOR ALLOWED

Round to 3 decimal places. Show all work

1. Fill in the coordinates from QII of the Unit Circle and the Table Values from QI.



2. Find the exact value of the following:

$$(a) \quad 5 \sin^2 \frac{7\pi}{4} - 2 \cos^2 \frac{7\pi}{3} = 5 \left(-\frac{1}{\sqrt{2}}\right)^2 - 2 \left(\frac{1}{2}\right)^2$$

$$= \frac{5}{2} - \frac{1}{2} = 2$$

$$(b) \quad \sec \frac{2\pi}{3} \tan \frac{7\pi}{6} + \cot \frac{11\pi}{6} \csc \frac{5\pi}{3}$$

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

$$(c) \quad \sin \left(\frac{7\pi}{4}\right) - 3 \cos \left(\frac{\pi}{2}\right) + \tan \left(\frac{11\pi}{6}\right) = \left(-\frac{1}{\sqrt{2}}\right) - 3(0) + \frac{-1}{\sqrt{3}}$$

$$= \frac{-\sqrt{3} - \sqrt{2}}{\sqrt{6}}$$