Precalculus Acc '17-18 Name SOLUTION KEY
Trig Basics

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

$r = \sqrt{313}$

$\sin A = -13/\sqrt{313}$ $\quad \csc A = -\sqrt{313}/13$

$\cos A = 12/\sqrt{313}$ $\quad \sec A = \sqrt{313}/12$

$\tan A = -13/12$ $\quad \cot A == -12/13$

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

$y = \sqrt{39}$

$\sin B = \sqrt{39}/8$ $\quad \csc B = 8/\sqrt{39}$

$\cos B = -5/8$ $\quad \sec B = -8/5$

$\tan B = -\sqrt{39}/5$ $\quad \cot B == -5/\sqrt{39}$

3. If $\sin C = -7/25$ in QIII, find the other five exact trig values:

$x = -24$

$\sin C = -7/25$ $\quad \csc C = -25/7$

$\cos C = -24/25$ $\quad \sec C = -25/24$

$\tan C = 7/24$ $\quad \cot C == 24/7$

4. What are the approximate values, in degrees of A, B and C above?

$A =$ $-47.291 \pm 360n$

$B =$ $128.682 \pm 360n$

$C =$ $-163.740 \pm 360n$

5. Find the approximate values of:

Cos -28= -.963

Sin -136°= -.695

Tan 2.34= -1.033

Sec -.717= 1.327

Csc 15.29°= 3.792

Cot 2 = -.458

6. Find the approximate values (in degrees) of:

$\cos^{-1}$ 1.705= No Solution

$\sin^{-1}$ (-0.516)= $-31.064 \pm 360n$, $211.064 \pm 360n$

$\tan^{-1}$ 0.758= $37.161 \pm 360n$, $217.161 \pm 360n$

$\sec^{-1}$ 2.982= $\pm 70.406 \pm 360n$

$\csc^{-1}$ -1.362= $-47.241 \pm 360n$, $227.241 \pm 360n$

7. 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.

$48\cos 303^\circ \vec{i} + 48\sin 303^\circ \vec{j}$

$8\cos 34^\circ \vec{i} + 8\sin 34^\circ \vec{j}$

$32.775\vec{i} + (-35.783)\vec{j}$

$|\vec{F}| = \sqrt{32.775^2 + 35.783^2} = 48.524 \text{ mph}$

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

8. 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 $\theta_{ref} = 88^\circ$

7. Find the exact value of the following:

(a) $5\sin^2\frac{7\pi}{4}-2\cos^2\frac{7\pi}{3}$

$5\left(\frac{1}{\sqrt{2}}\right)^2-2\left(\frac{1}{2}\right)^2=\frac{5}{2}-\frac{1}{2}=2$

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

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

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

10. If $\vec{s}=4\vec{i}-3\vec{j}$ and $\vec{r}=-3\vec{i}+6\vec{j}$, find:

a. $2\vec{s}-3\vec{r}$ $=2(4\vec{i}-3\vec{j})-3(-3\vec{i}+6\vec{j})=17\vec{i}-24\vec{j}$

b. $|\vec{r}-4\vec{s}|$ $=|(-3\vec{i}+6\vec{j})-4(4\vec{i}-3\vec{j})|=|-19\vec{i}+18\vec{j}|$

$=\sqrt{19^2+18^2}=\sqrt{685}\approx 26.173$

c. The unit vector in the direction $\vec{s}$ $\frac{4\vec{i}-3\vec{j}}{\sqrt{4^2+3^2}}=\frac{4}{5}\vec{i}-\frac{3}{5}\vec{j}$