Name: ______________________________ Date: KEY

Precalculus

Cumulative Review #6 Due: ____________________

Directions: Show all work for full credit. Correct answers without supporting work will receive 1 credit.

1. State the amplitude and period for the function y = 6 $sin\frac{\theta}{2}$.

$Amp = |6| = 6$ $\quad Per = \frac{2\pi}{\frac{1}{2}} = 4\pi$

2. If a pulley is rotating at 16 revolutions per minute, what is its rate in radians per second?

$\frac{16\text{ rev.}}{1\text{ min}} \cdot \frac{2\pi\text{ rad}}{1\text{ rev.}} \cdot \frac{1\text{ min}}{60\text{ sec}} = \frac{32\pi\text{ rad}}{60\text{ sec}} = 1.68\ \text{rad/sec}$ or $\frac{8\pi}{15}$

3. Find the angular velocity of the minute hand of a clock in radians per second (round to the nearest tenth).

$\frac{1\text{ rot}}{60\text{ min}}\left(\frac{2\pi\text{ rad}}{1\text{ rot}}\right)\left(\frac{1\text{ min}}{60\text{ sec}}\right) = \frac{2\pi}{3600\text{ sec}} = .0017\ \frac{\text{rad}}{\text{sec}}$

or $\frac{\pi}{1800}$

4. Write the equation 4x + y = 6 in normal form. State the length of the normal segment as well as the measure of the angle made by the normal segment and the positive x-axis.

$4x + y - 6 = 0$

$+\sqrt{4^2+1^2} = \sqrt{17}$

$\frac{4}{\sqrt{17}}x + \frac{1}{\sqrt{17}}y - \frac{6}{\sqrt{17}} = 0$

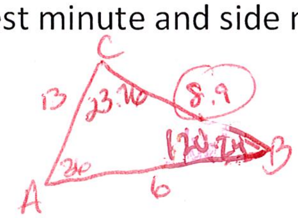
$P = \frac{6\sqrt{17}}{17} \approx 1.46$

$\tan\phi = \frac{1}{4}$

$\phi = 14.0°$

.

5. Solve triangle ABC given A = 36°, b = 13 and c = 6. Round angle measures to the nearest minute and side measures to the nearest tenth.



$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 13^2 + 6^2 - 2(13)(6)\cos 36$

$a^2 = 205 - 156\cos 36$

$a^2 = 205 - 126.2066511$

$a^2 = 78.7933$ $\quad a = 8.9$

$13^2 = 6^2 + 8.9^2 - 2(6)(8.9)\cos B$

$53.79 =$

$B = 120.24$

$C = 23.76$

6. Evaluate sec($\cos^{-1}\frac{2}{5}$) if the angle is in quadrant I.

$x = 2$

$r = 5$

$x^2 + y^2 = r^2$

$2^2 + y^2 = 5^2$

$4 + y^2 = 25$

$y = \sqrt{21}$

$\sec\theta = \frac{r}{x} = \frac{5}{2}$

7. Determine the equation of the slant asymptote for f(x) = $\frac{x^2+2x-3}{x+5}$.

$$\begin{array}{r} x-3 \quad R12 \\ x+5 \,\big)\, \overline{x^2+2x-3} \\ \ominus\; x^2+5x \\ \hline -3x-3 \\ \ominus\; -3x-15 \\ \hline 12 \end{array}$$

$y = x-3$

OR

$$\begin{array}{r|rrr} -5 & 1 & 2 & -3 \\ & & -5 & 15 \\ \hline & 1 & -3 & 12 \end{array}$$

$1x-3 \; R12$

$y = x-3$

8. Simplify the expression $\frac{1-\sin^2 x}{\sin^2 x}$.

$\frac{\cos^2 x}{\sin^2 x} = \cot^2 x$

9. Find the value of the determinant $\begin{vmatrix} -2 & 4 & -1 \\ 1 & -1 & 0 \\ -3 & 4 & 5 \end{vmatrix}$

$-2\begin{vmatrix} -1 & 0 \\ 4 & 5 \end{vmatrix} - 4\begin{vmatrix} 1 & 0 \\ -3 & 5 \end{vmatrix} - 1\begin{vmatrix} 1 & -1 \\ -3 & 4 \end{vmatrix}$

$-2(-5) - 4(5) - 1(1)$

$+10 - 20 - 1 = -11$

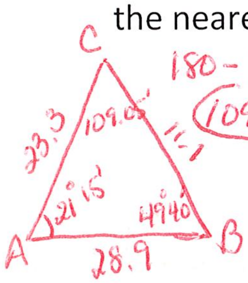
10. Find Arccos $\frac{\sqrt{3}}{2}$. (Remember "A" in Arccos means something)

restricted domain for cos : $0 \leq x \leq \pi$

sin & Tan : $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$

$\text{Arccos}\left(\frac{\sqrt{3}}{2}\right) = 30°$

11. Solve ΔABC if A = 21°15', B = 49°40' and c = 28.9 . Round angle measures to the nearest minute and side measures to the nearest tenth.



$180 - 70°55'$

$109°05'$

$\frac{\sin 109°05'}{28.9} = \frac{\sin 49°40'}{b}$

$b = \frac{28.9 \sin 49°40'}{\sin 109°05'}$

$b = 23.3$

$\frac{\sin 109°05'}{28.9} = \frac{\sin 21°15'}{a}$

$a = \frac{28.9 \sin 21°15'}{\sin 109°05'}$

$a = 11.1$

12. Find four other pairs of polar coordinates that represent the same point as (4, 45°)

(−4, 225°)

(4, 405°)

(−4, −135°)

(4, −315°)