January 27, 2006 Math 026 Quiz #2 Name: _____

The number in brackets gives how many points the question is worth. You have 10 minutes for this quiz; no books, notes, calculators, French hens, or turtledoves are allowed.

(2) 1. Which two quadrants could θ lie in if $\csc\theta$ is negative?

Solution: $\csc\theta = \frac{1}{\sin\theta}$, so $\csc\theta$ has the same algebraic sign as $\sin\theta$. (Remember that two numbers which are reciprocals have the same algebraic sign). $\sin\theta$ is positive in quadrants I and II, and negative in quadrants III and IV, so θ could have its terminal side in either quadrant III or quadrant IV.

(3) 2. Use one of the Pythagorean identities to find $\cos\beta$, given that $\sin\beta = \frac{3}{4}$ and β is in quadrant II.

Solution: Using the identity $\cos\beta = \pm\sqrt{1-\sin^2\beta}$, we have

$$\begin{aligned}
\cos\beta &= \pm\sqrt{1-(\sin\beta)^2} \\
&= \pm\sqrt{1-(\frac{3}{4})^2} \\
&= \pm\sqrt{1-\frac{9}{16}} \\
&= \pm\sqrt{\frac{16}{16}-\frac{9}{16}} \\
&= \pm\sqrt{\frac{7}{16}} \\
&= \pm\frac{\sqrt{7}}{4}
\end{aligned}$$

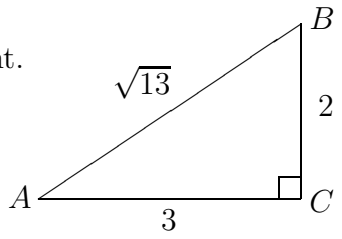
and since β is in quadrant II, $\cos\beta$ is negative, so $\cos\beta = -\frac{\sqrt{7}}{4}$.

(3) 3. Simplify $\cos\theta\cot\theta + \sin\theta$ as much as possible.

Solution:

$$\begin{aligned}
\cos\theta\cot\theta + \sin\theta &= \cos\theta\frac{\cos\theta}{\sin\theta} + \sin\theta \\
&= \frac{\cos^2\theta}{\sin\theta} + \frac{\sin^2\theta}{\sin\theta} \\
&= \frac{\cos^2\theta + \sin^2\theta}{\sin\theta} \\
&= \frac{1}{\sin\theta} \\
&= \csc\theta
\end{aligned}$$

(2) 4. Calculate $\cot A$ and $\sec B$, using the figure at right.



Solution:

$$\begin{aligned}
\cot A &= \frac{1}{\tan A} \\
\tan A &= \frac{\text{opposite to A}}{\text{adjacent to A}} \\
&= \frac{2}{3} \\
\cot A &= \frac{3}{2}
\end{aligned}$$

$$\begin{aligned}
\sec B &= \frac{1}{\cos B} \\
\cos B &= \frac{\text{adjacent to B}}{\text{hypotenuse}} \\
&= \frac{2}{\sqrt{13}} \\
\sec B &= \frac{\sqrt{13}}{2}
\end{aligned}$$