Solution for Email Problem 13 for Friday, September 29

This problem is from Pre-Class Problems 6.

For the 11:30 class (Section 006), your answers are due by email by 10:00 am and your work is due at the beginning of class on Friday, September 29.

For the 2:30 class (Section 009), your answers are due by email by 1:00 pm and your work is due at the beginning of class on Friday, September 29.

13. If the terminal side of the angle $\alpha$ is in the second quadrant and lies on the line $14x + 6y = 0$, then find $\sin \alpha$ and $\cot \alpha$.

\[14x + 6y = 0 \Rightarrow 6y = -14x \Rightarrow y = -\frac{14}{6}x = -\frac{7}{3}x\]

Picking the number $-3$ for $x$, we have the following.

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$-3$</td>
<td>$7$</td>
</tr>
</tbody>
</table>

\[y = -\frac{7}{3}(-3) = \frac{7}{1}(1) = 7\]

NOTE: The point $(-3, 7)$ is in the second quadrant and lies on the line $14x + 6y = 0$. Since the terminal side of the angle $\alpha$ is in the second quadrant and lies on this line, then the point $(-3, 7)$ also lies on the terminal side of $\alpha$.

\[r = \sqrt{x^2 + y^2} = \sqrt{9 + 49} = \sqrt{58}\]

\[\sin \alpha = \frac{y}{r} = \frac{7}{\sqrt{58}} \quad \cot \alpha = \frac{x}{y} = -\frac{3}{7}\]