Precalculus Summer Assignment

Happy summer!!

Your task this summer is to memorize and apply the unit circle. This will be very useful when we get to our trigonometry units. You should be able to complete a blank unit circle and table from memory. Look for patterns that will make it easier. There are plenty of practice sites available on the internet. Just search unit circle practice. After you have memorized the unit circle, you should be able to complete the attached problems without referring to the filled in circle. You will have periodic non-reducible minor quizzes on this throughout the year.
**Unit Circle Worksheet**

1. Draw a unit circle
2. Put the radian and degree measure next to each angle.
4. Find the ordered pair that would go with each one. \((\cos \theta, \sin \theta)\)
5. Complete the following chart:

<table>
<thead>
<tr>
<th>radians</th>
<th>degrees</th>
<th>(\cos \theta)</th>
<th>(\sin \theta)</th>
<th>(\tan \theta)</th>
<th>(\sec \theta)</th>
<th>(\csc \theta)</th>
<th>(\cot \theta)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>30°</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>3.</td>
<td>45°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>60°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>90°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>120°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>135°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>150°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>180°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>radians</td>
<td>degrees</td>
<td>cos $\theta$</td>
<td>sin $\theta$</td>
<td>tan $\theta$</td>
<td>sec $\theta$</td>
<td>csc $\theta$</td>
<td>cot $\theta$</td>
</tr>
<tr>
<td>------</td>
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<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>10.</td>
<td>210°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>225°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>240°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>270°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>300°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>315°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>330°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>360°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Practice Worksheet: The Unit Circle**

Fill in the blanks.

1. When a circle is divided into 8 equal sections, each central angle measures _____ degrees and _____ radians.
2. All of the coordinates for special angles on the unit circle can be derived from the ______ quadrant.
3. The angle whose terminal side passes through \( \left( \frac{\sqrt{3}}{2}, -\frac{1}{2} \right) \) is in the ______ quadrant.
4. The terminal side of \( \frac{-5\pi}{2} \) passes through the point (_____, _____) which makes it a ___________ angle.
5. The length of the segment between \( \left( \frac{1}{2}, \frac{\sqrt{3}}{2} \right) \) and the origin is _____ unit(s) because it is the _________ of the circle.
6. When a circle is divided into _______ equal sections, each central angle measures \( \frac{\pi}{6} \).
7. The angle whose terminal side passes through \( \left( -\frac{1}{2}, -\frac{\sqrt{3}}{2} \right) \) is _______ radians.
8. The terminal side of \( 510^\circ \) passes through the point (_____, _____) because it is ______________ with \( 150^\circ \).
9. The length of the segment between \( \left( \frac{-\sqrt{2}}{2}, \frac{\sqrt{2}}{2} \right) \) and \( \left( \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \right) \) is _____ unit(s) because it is the __________ of the circle.
10. Because the angles \( \frac{13\pi}{6} \) and \( \frac{-\pi}{6} \) have a reference angle of _____ radians, if \( \frac{13\pi}{6} \) passes through \( \left( \frac{\sqrt{3}}{2}, \frac{1}{2} \right) \), then \( \frac{-\pi}{6} \) must pass through \( \left( \frac{-1}{2}, \frac{1}{2} \right) \).
11. The coordinates for the _____ degree angle on the Unit Circle were derived by using the _______________ _________________ to write the equation \( a^2 + a^2 = 1 \).
12. The coordinates for the _____ degree angle and _____ degree angle on the Unit Circle were derived by using the _________________ Rule for right triangles.

Find a positive coterminal angle for each of the following special angles on the unit circle:

13. \( \frac{15\pi}{2} \)  
14. \(-3\pi\)  
15. \( \frac{-19\pi}{4} \)  

16. \( \frac{11\pi}{3} \)  
17. \( \frac{3\pi}{4} \)  
18. \(-585^\circ\)
Find a negative coterminal angle for each of the following special angles on the unit circle:

19. $\frac{-8\pi}{3}$
20. $\frac{5\pi}{2}$
21. $90^\circ$
22. $\frac{-5\pi}{6}$
23. $8\pi$
24. $-\frac{17\pi}{6}$
25. Using only the first quadrant shown in the diagram, complete the table shown.

<table>
<thead>
<tr>
<th>Angle ($\theta$)</th>
<th>What is the reference angle of $\theta$? (Hint: all reference angles are in Q1)</th>
<th>In what quadrant is the terminal side of $\theta$ located?</th>
<th>Coordinate of point on the terminal side of $\theta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{9\pi}{4}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\frac{13\pi}{3}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\frac{11\pi}{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$-\frac{7\pi}{4}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$-\frac{7\pi}{3}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$-\frac{17\pi}{6}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\frac{23\pi}{6}$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26. Using the picture shown below of a non-special angle on the Unit Circle. Complete the chart.

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>Angle Measure (radians)</th>
<th>Angle Measure (degrees)</th>
<th>Coordinate on Terminal Side of Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$\frac{\pi}{12}$</td>
<td>$30^\circ$</td>
<td>(0.2588, 0.9659)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>$345^\circ$</td>
<td></td>
</tr>
</tbody>
</table>