Algebra 2 Trig

U12. 3 Angles in Radians  Notes

1 radian: an angle that create an arc length that is equal to the radius.

\[ \theta = 1 \text{ radian (rad)} \]

1 radian \( \approx \) _________°

This comes from the arc length formula: \( s = \theta r \) where \( s \) is arc length, and \( r \) is the radius.

Derive the radian measure of a circle:

\[
360° = \underline{\phantom{100}} \quad \text{so} \quad 180° = \underline{\phantom{100}}
\]

Conversion:

**Degrees to Radians:**

<table>
<thead>
<tr>
<th>Degrees</th>
<th>Radians</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 45°</td>
<td>2. 90°</td>
</tr>
<tr>
<td>3. 30°</td>
<td>4. 60°</td>
</tr>
<tr>
<td>5. 150°</td>
<td>6. 600°</td>
</tr>
</tbody>
</table>
Convert the following into radians

7. \( \frac{\pi}{6} \)
8. \(-\frac{4\pi}{3}\)
9. 2.5 radians

10. \( \frac{11\pi}{6} \)
11. \(-\frac{8\pi}{5}\)
12. 5 radians

Radians and the quadrants

Graph the following angles in standard position.

13. \( \frac{4\pi}{3} \)
14. \(-\frac{11\pi}{6}\)
15. \(\frac{9\pi}{4}\)

16. \(-\frac{\pi}{3}\)
17. \(3\pi\)
18. \(-\frac{13\pi}{3}\)
Coterminal Angles

Let’s look at $\frac{2\pi}{3}$

Coterminal angles:

Find 2 coterminal angles (one positive & one negative) for each of the following

22. $\frac{\pi}{3}$

23. $\frac{2\pi}{3}$

24. $\frac{7\pi}{6}$

25. $\frac{9\pi}{4}$
Reference Angle

Let’s look at $\frac{2\pi}{3}$

Reference Angle:

26. $\frac{13\pi}{3}$

27. $\frac{4\pi}{3}$

28. $\frac{5\pi}{6}$

29. $-\frac{\pi}{3}$