

Algebra 2C Notes

Name: _____

13-3 Radian Measure

Date: _____ Hr: _____

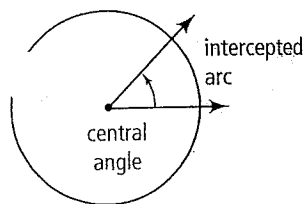
Objectives:

- To find radian measure for angles.
- To find the length of an arc of a circle.

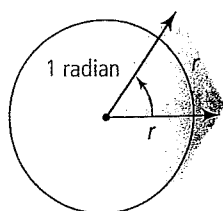
Common Core Standard

Prepares for F.TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

A _____ of a circle is an angle with a vertex at the center of a circle. An _____ is the portion of the circle with endpoints on the sides of the central angle and remaining points within the interior of the angle



A _____ is the measure of a central angle that intercepts an arc with length equal to the radius of the circle. Radians, like degrees, measure the amount of rotation from the initial side to the terminal side of an angle.



An angle with a full circle rotation measures 2π radians. An angle with a semicircle rotation measures π radians.

Take note

Key Concept Proportion Relating Radians and Degrees

You can use the proportion $\frac{a^\circ}{180^\circ} = \frac{r \text{ radians}}{\pi \text{ radians}}$ to convert between radians and degrees.

Take note

Key Concept Converting Between Radians and Degrees

To convert degrees to radians, multiply by $\frac{\pi \text{ radians}}{180^\circ}$.

To convert radians to degrees, multiply by $\frac{180^\circ}{\pi \text{ radians}}$.

Example 1: Using Dimensional Analysis

What is the degree measure of an angle of $\frac{-7\pi}{30}$ radians?

What is the radian measure of 225°?

Example 2: Finding Cosine and Sine of a Radian Measure

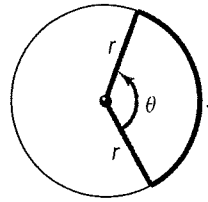
What are the exact measures of $\sin(\pi \text{ radians})$ and $\cos(\pi \text{ radians})$?

If you know the radius and the measure in radians of a central angle, you can find the length of an intercepted arc. (arc length)

Take note

Key Concept Length of an Intercepted Arc

For a circle of radius r and a central angle of measure θ (in radians), the length s of the intercepted arc is $s = r\theta$.



Example 3: Finding the Length of an Arc

What is the length s to the nearest tenth?

Example 4: Using Radian Measure to Solve a Problem

A satellite in geosynchronous orbit travels one Earth circumference in a full day. From a point on the ground, the satellite appears stationary overhead. The orbital height for a geosynchronous satellite is about 36,000 km. The radius of Earth is 6400 km. About how far does the satellite travel in 8 hours? Assume the length of an Earth day is exactly 24 hours.

