

Secondary Math 2B

Unit 7 Lesson 6-7: Angles in Radians

Vocabulary:

Arc: portion of a circle

Arc Length: measures a fraction of a circle's circumference

Radian: the ratio between an arc length and the radius.

Radians: Another Way to Measure Angles

A radian is the measure of an arc (or the central angle of an arc) with a length equal to the radius. So, we can calculate how much a single radian is in degrees. Let's also consider how many radians there are in an entire circle.

How to quickly convert between radians and degrees.

Radians to Degrees

$$\frac{12\pi}{15} \text{ radians}$$

5 radians

Degrees to Radians

75°

212.45°

Arc Length Formula when you use radians instead of degrees.

$$l = \theta r$$

Calculate the length of an arc with central angle measure of $\frac{\pi}{4}$ radians and radius of length 5

Calculate the radius of an arc with arc measure of 2 radians and an arc length of 14 inches.

Example Quick Check Problems

- 1) Which of the following is a unit used for measuring angles and is the constant of proportionality between the length of an arc and its radius?

a. inchesb. centimetersc. radiansd. degrees

- 2) A central angle forms an arc on a circle. If the arc length is equal to the radius, what is the measure of the angle in radians?

- 3) A circle has radius 0.7 in and an arc length of 0.35 in. What is the measure of the central angle in radians?

- 4) An arc with a length of 4.4 yd has a central angle that measures 1.1 radians. What is the radius of the circle?

- 5) A circle has a radius of 8 m. What is the length of the arc formed by a central angle that measures $\frac{\pi}{4}$ radians?