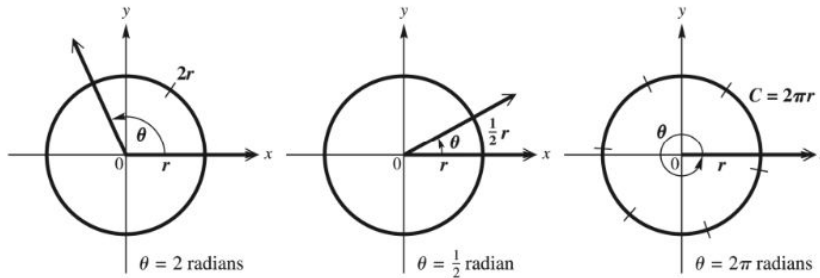


Radian Measure

Radian

An angle with its vertex at the center of a circle that intercepts an arc on the circle equal in length to the radius of the circle has a measure of _____.



In general, if θ is a central angle of radius r , and θ intercepts an arc of length s , then the radian measure of θ is _____.

The ratio $\frac{s}{r}$ is a pure number, where s and r are expressed in the same units. *Thus, “radians” is not a unit of measure like feet or centimeters.*

Conversions between Degrees and Radians

$360^\circ = \underline{\hspace{2cm}}$ radians

$180^\circ = \underline{\hspace{2cm}} (2\pi)$ radians = $\underline{\hspace{2cm}}$ radians

$1^\circ = \underline{\hspace{2cm}}$ radian or **1 radian = $\underline{\hspace{2cm}}$ $^\circ$**

Converting between Degrees and Radians

1. Multiply a degree measure by _____ radian and simplify to convert to radians.
2. Multiply a radian measure by _____ $^\circ$ and simplify to convert to degrees.

1. Convert each degree measure to radians.
 - a. 108°
 - b. -135°
 - c. 325.7°

2. Convert each radian measure to degrees.

(a) $\frac{11\pi}{12}$

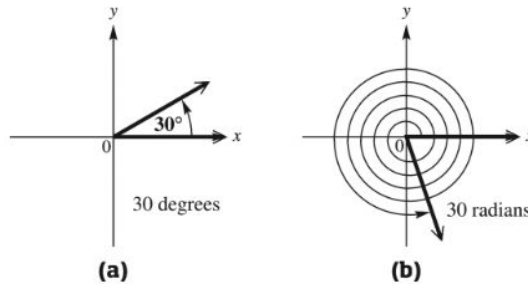
(b) $-\frac{7\pi}{6}$

(c) -2.92

Agreement on Angle Measurement Units

If no unit of angle measure is specified, then the angle is understood to be measured in radians.

For example, the figure on the left shows an angle of 30° , and the figure on the right shows an angle of 30 (which means 30 radians). An angle with measure 30 radians is coterminal with an angle of approximately 279° .



Note the difference between an angle of 30 degrees and an angle of 30 radians.

Equivalent Angle Measures

Degrees	Radians		Degrees	Radians	
	Exact	Approximate		Exact	Approximate
0°	0	0	90°	_____	_____
30°	_____	0.52	_____	_____	3.14
45°	_____	_____	270°	_____	_____
_____	$\frac{\pi}{3}$	_____	360°	_____	_____

These exact values are *rational multiples* of π .

Area of a Sector of a Circle

A _____ is the portion of the interior of a circle intercepted by a central angle.

Area of a Sector

The area \mathcal{A} of a sector of a circle of radius r and central angle θ is given by the following formula.

$$\mathcal{A} = \frac{1}{2}r^2\theta, \text{ where } \theta \text{ is in radians}$$

As in the formula for arc length, the value of θ must be in _____ when this formula is used for the area of a sector.

5. Find the area of a sector of a circle having radius 15.20 ft and central angle 108.0° .