

Trig 6.1

Change from radian to degree measure

Change from degree to radian measure

Find the length of an arc given the measure of the central angle

Find the area of a sector

$$\frac{180}{\pi} = \frac{\text{deg}}{\text{rad.}}$$

reference angles

proportion

unit circle

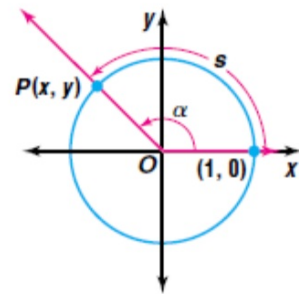
handy angles

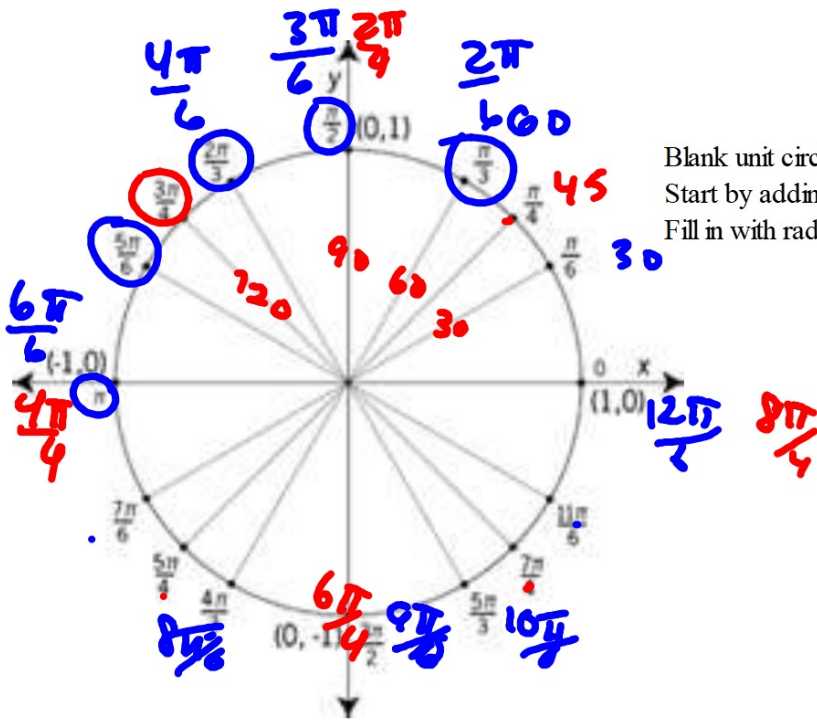
**radian (new)

circular arc

central angle

<https://www.youtube.com/watch?v=So9gSIDT6Kg>





Blank unit circle
 Start by adding landmarks (x,y)
 Fill in with radian measurements

Change each radian measure to degree measure. Round to the nearest tenth, if necessary.

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

$$\frac{180^\circ}{\pi} = \frac{x}{\frac{3\pi}{2}}$$

~~$x\pi = 180 \cdot \frac{3\pi}{2}$~~

8. -1.75



$$\frac{180^\circ}{\pi} = \frac{x}{-1.75}$$

$x \cdot \pi =$

$x = -100.3^\circ$

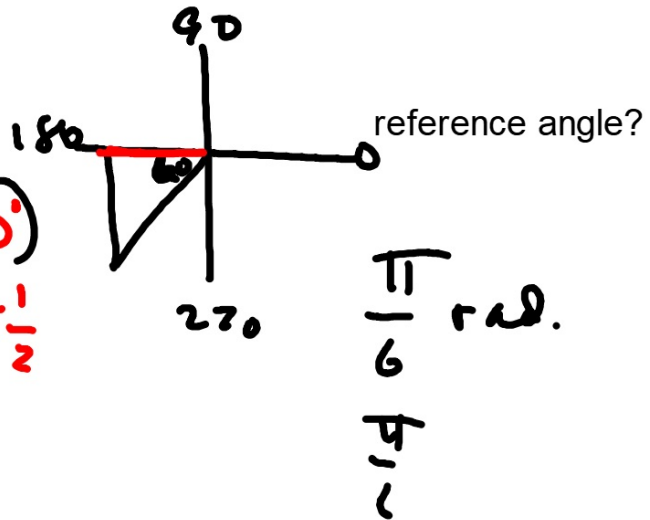
$x = 270^\circ$

Example 2 Evaluate $\cos \frac{4\pi}{3}$.

$$\cos(240^\circ) = -\frac{1}{2}$$

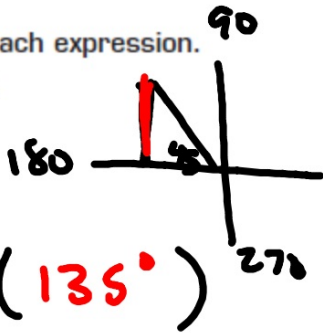
$$\frac{180}{\pi} = \frac{x}{\frac{4\pi}{3}}$$

$$x \cdot \cancel{\pi} = 180 \cdot \frac{4\cancel{\pi}}{3}$$
$$x = 240^\circ$$



Evaluate each expression.

9. $\sin \frac{3\pi}{4}$



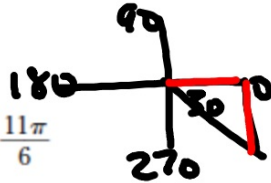
$\sin(135^\circ)$

$+\frac{\sqrt{2}}{2}$

$\frac{180}{4} = \frac{x}{36}$

~~$\pi x = 180 \cdot \frac{36}{4}$~~

10. $\tan \frac{11\pi}{6}$



reference angle?

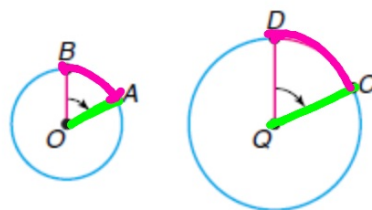
$\tan(\quad) =$

$\frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

~~$\frac{180}{4} = \frac{x}{36}$~~

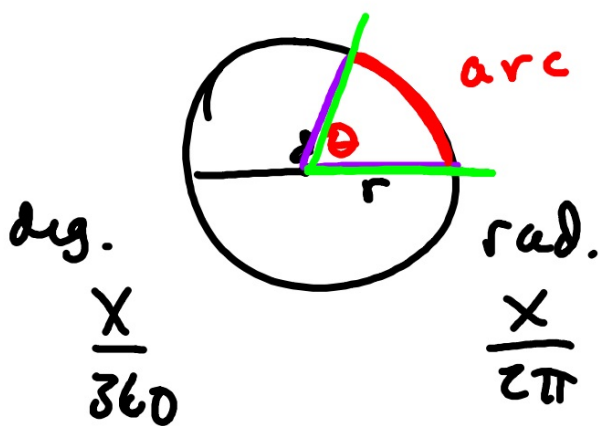
~~$x \cdot \pi = 180 \cdot \frac{11\pi}{6}$~~
 $x = 330^\circ$

Radian measure can be used to find the length of a **circular arc**. A circular arc is a part of a circle. The arc is often defined by the **central angle** that intercepts it. A central angle of a circle is an angle whose vertex lies at the center of the circle.



What fraction of the circle is it?

What is the circumference? What fraction of the circle is it?



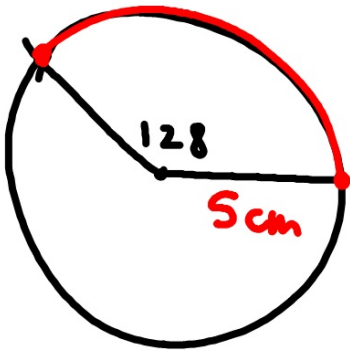
p. 345

Length of
an Arc

The length of any circular arc s is equal to the product of the measure of the radius of the circle r and the radian measure of the central angle θ that it subtends.

$$s = r\theta$$

- 3 Given a central angle of 128° , find the length of its intercepted arc in a circle of radius 5 centimeters. Round to the nearest tenth.



$$C = \pi \cdot 10$$

$$C = 31.419$$

$$\frac{128}{360} \left(\downarrow \right)$$

$$\underline{11.2\text{ cm}}$$

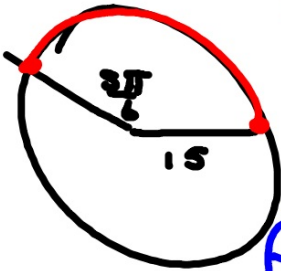
$$\frac{6\pi}{6}$$

Given the measurement of a central angle, find the length of its intercepted arc in a circle of radius 15 inches. Round to the nearest tenth.

$$11. \frac{5\pi}{6}$$

360

$$12. 77^\circ$$



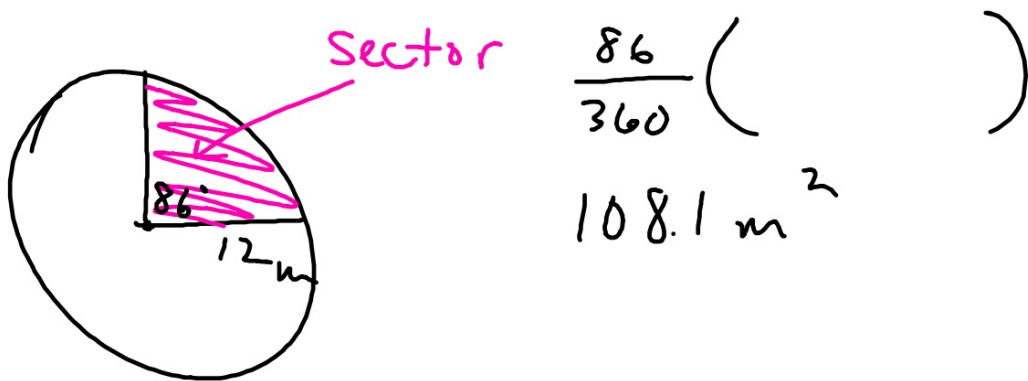
$$C = \pi \cdot 30$$

$$C = 94.248$$

$$\frac{5\pi}{6} \cdot \frac{1}{2\pi} (94.248)$$

$$39.3 \text{ in}$$

$$A = \pi r^2 = \pi \cdot 12^2 = 452.389$$



$$\frac{86}{360} \left(\quad \right)$$

$$108.1 \text{ m}^2$$