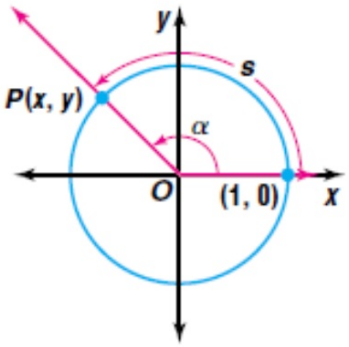
Trig 6.1

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

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



proportion

unit circle

handy angles

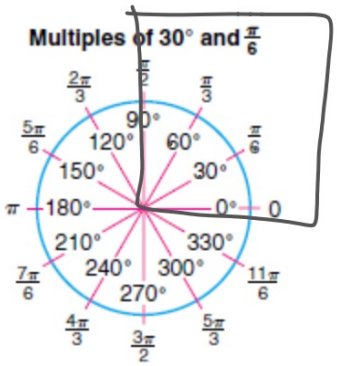
radian

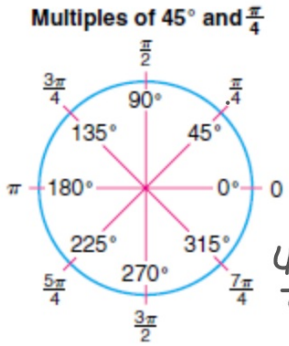
circular arc

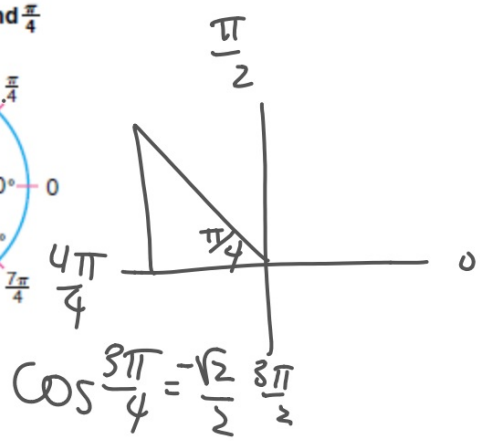
central angle

sector

activity: triangle puzzle

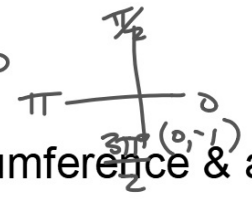






Degrees	0	30	45	60	90	120	135	150	180	210	225	240	270	300	315	330
Radians	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$

$\cos \frac{3\pi}{2} = 0$



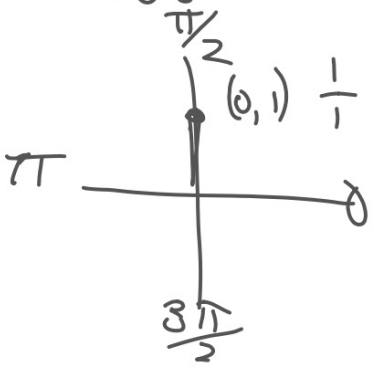
$2\pi = \frac{12\pi}{6}$

$\frac{0}{1}$

Circumference & area formulas

$\cos 270$

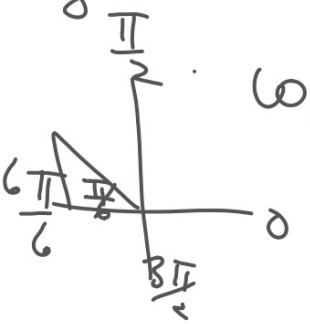
$\cos$



$\sin \frac{-12\pi}{8} + \frac{16\pi}{8}$

$\sin \frac{4\pi}{8}$

$\sin \frac{\pi}{2} = 1$



$\cos \frac{17\pi}{6} - \frac{12\pi}{6}$

$\cos \frac{5\pi}{6} = -\frac{\sqrt{3}}{2}$

$C = \pi d = 2\pi r$

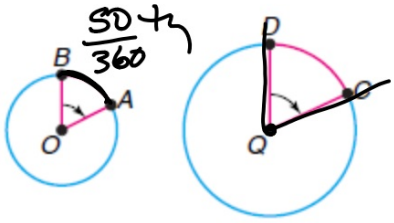
(partial = arc)

$A = \pi r^2$

(partial sector)

$\frac{n}{360^\circ}$ $\frac{n}{2\pi}$

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.



The angle is the same. The length of arc depends on the size of the circle.

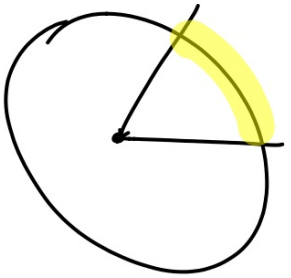
(C)x(fraction of circle)

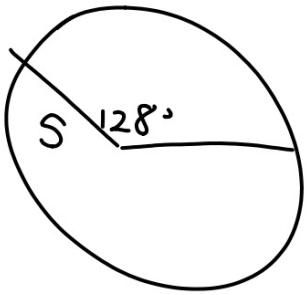
$C \cdot (\text{frac}) = \text{arc}$

$A \cdot (\text{frac}) = \text{sector}$

"intercepted" arc...."subtended" arc...

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*frac of circle

$$\left(\pi \cdot 10\right)\frac{128}{360}$$

11.2 cm

$\frac{\pi}{180} = \frac{\frac{5\pi}{6}}{x}$ $\pi \cdot x = 471.24$ $x = 150°$

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

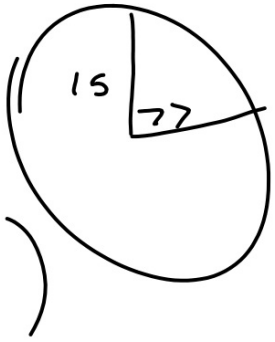
12. 77°

C*frac

$\frac{\frac{5\pi}{6}}{(2\pi)}(\pi \cdot 30)$

0.4166 ( )

39.3 in



$\left(\frac{77}{360}\right)(\pi \cdot 30) \approx 20.2$ in

$\frac{150}{360}(30\pi) = 39.2$

latitude and longitude (9th geography)

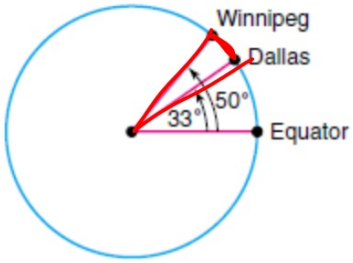
$\frac{7\pi}{12}$

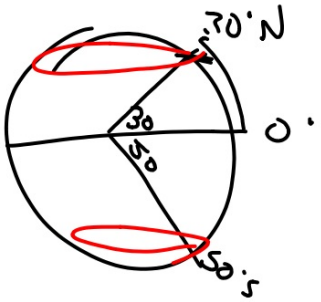
$\frac{\frac{7\pi}{12}}{2\pi}\left(\pi \cdot 24\right)$

$\frac{44}{360}\left(\quad\right)$ 22.0

Shortest distance from Winnipeg to Dallas???
Can't drill through the earth...

4 **GEOGRAPHY** **Winnipeg, Manitoba, Canada, and Dallas, Texas, lie along the 97° W longitude line. The latitude of Winnipeg is 50° N, and the latitude of Dallas is 33° N. The radius of Earth is about 3960 miles. Find the approximate distance between the two cities.**





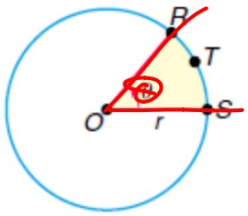
$\frac{23}{360} \cdot (2\pi \cdot 3960)$

1589.6 miles

rθ

C of circle x fraction of circle

A **sector** of a circle is a region bounded by a central angle and the intercepted arc. For example, the shaded portion in the figure is a sector of circle O. The ratio of the area of a sector to the area of a circle is equal to the ratio of its arc length to the circumference.



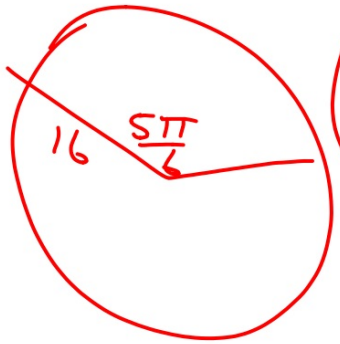
must be in radians

$\frac{n}{2\pi}$

(area)x(what fraction of the circle)

$\pi r^2\left(\frac{n}{360}\right)$

5 Find the area of a sector if the central angle measures $\frac{5\pi}{6}$ radians and the radius of the circle is 16 centimeters. Round to the nearest tenth.



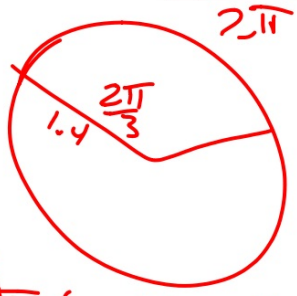
$$\left(\frac{\frac{5\pi}{6}}{2\pi}\right)\pi \cdot 16^2$$

335.1

Find the area of each sector given its central angle θ and the radius of the circle. Round to the nearest tenth.

13. $\theta = \frac{2\pi}{3}, r = 1.4$

14. $\theta = 54°, r = 6$



$\frac{2\pi}{3}$ / 2π $\quad \pi (1.4)^2 \quad 2.1$

$\frac{54}{360}$

WB 6.1

1-11 odds

13-23 all