

Equation of a circle:

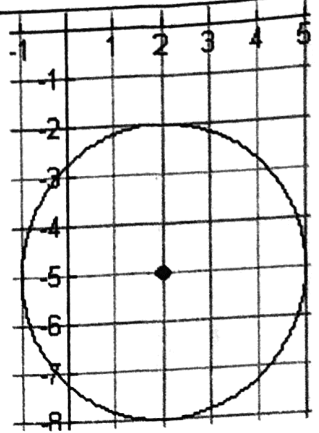
where (h,k) is the center and r is the radius.

1. What is the equation of the circle to the right?

$$(x-2)^2 + (y+5)^2 = 9$$

2. what are the center and the radius of the following circle:

? $(2, -5)$
 $r = 3$



Ex: Write an equation for a circle with a radius of 8 and a center at (3,-2)

Answer:

Completing the square:

Example	$4x^2 - 2x - 5 = 0$
Get the variables you want to work with alone on one side.	$4x^2 - 2x = 5$
Divide by a.	$x^2 - \frac{1}{2}x = \frac{5}{4}$
Find b/2 and square it. Add that to both sides.	\downarrow $\frac{1}{16}$
Factor the perfect square. It should factor to $(x+b/2)^2$.	$x^2 - \frac{1}{2}x + \frac{1}{16} = \frac{5}{4} + \frac{1}{16}$ $(x - \frac{1}{4})^2 = \frac{21}{16}$

Use completing the square to put the following equations of a circle in standard form:

1. $x^2 + y^2 + 16x - 22y - 20 = 0$

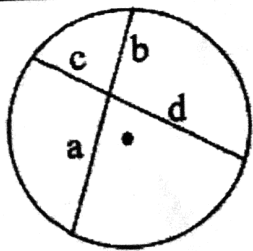
$$(x^2 + 16x + 8^2) + (y^2 - 22y + 11^2) = 20 + 64 + 121$$

$$(x+8)^2 + (y-11)^2 = 205$$

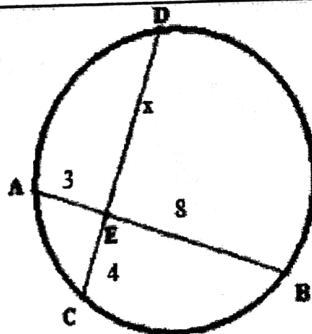
2. $x^2 + y^2 - 12x + 8y + 32 = 0$

$$(x^2 - 12x + 6^2) + (y^2 + 8y + 4^2) = -32 + 36 + 16$$

$$(x-6)^2 + (y+4)^2 = 20$$



$$a \cdot b = c \cdot d$$

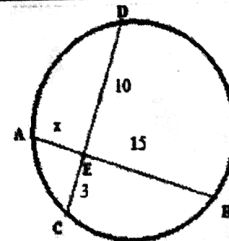


$4x = 3(8)$ simplify

$4x = 24$ divide by 4

$x = 6$

1.

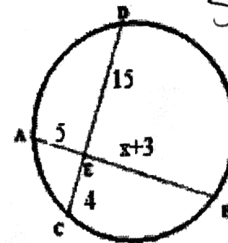


$15x = 10 \cdot 3$

$15x = 30$

$x = 2$

2.

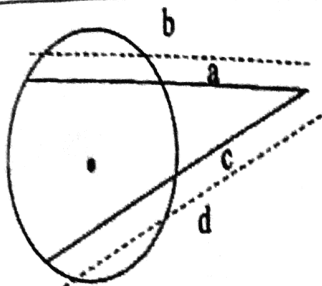


$5(x+3) = 60$

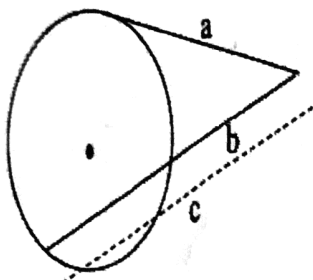
$5x + 15 = 60$

$5x = 45$

$x = 9$

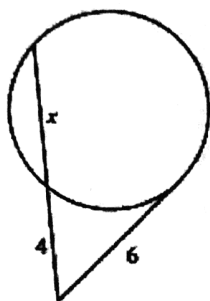


$$a \cdot b = c \cdot d$$



$$b \cdot c = a^2$$

outside · whole = outside · whole



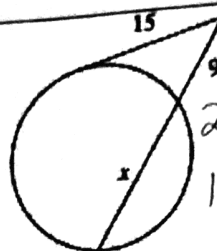
simplify

subtract 16

divide by 4

1

1.



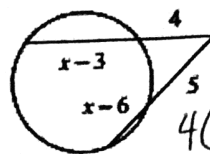
$$15 \cdot 15 = 9(9+x)$$

$$225 = 81 + 9x$$

$$144 = 9x$$

$$x = 16$$

2.

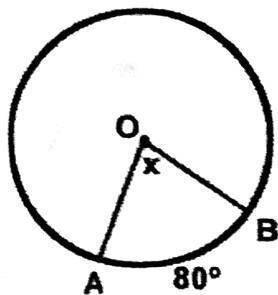


$$4(4+x-3) = 5(5+x-6)$$

$$4(x+1) = 5(x-1)$$

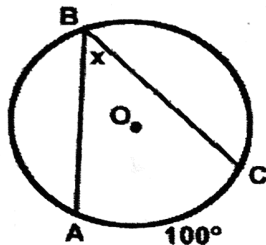
$$4x+4 = 5x-5$$

$$9 = x$$



Central angle = intercepted arc

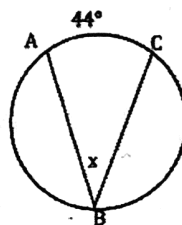
$$x = 80$$



Inscribed angle = $\frac{1}{2}$ (intercepted arc)

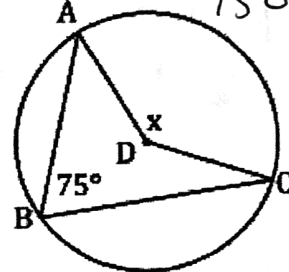
$$x = 50$$

1.

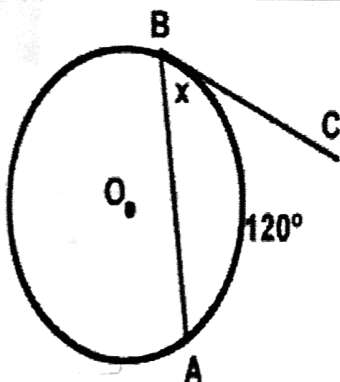


$$x = 22^\circ$$

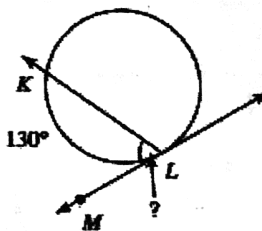
2.



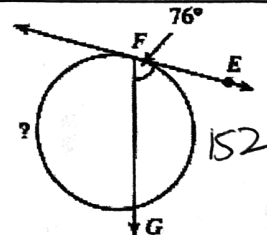
$$x = 150^\circ$$



Tangent Chord Angle = $\frac{1}{2}$ Intercepted Arc

$$m\angle ABC = \frac{1}{2} m\widehat{AB}$$


$$x = 65^\circ$$

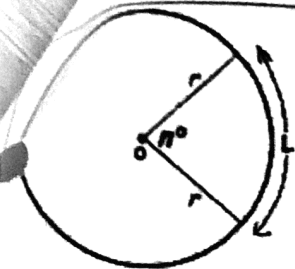


$$x = 208^\circ$$

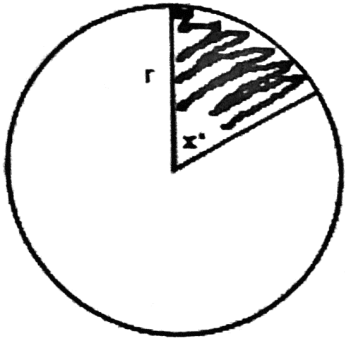
Find the arc length

arc length:

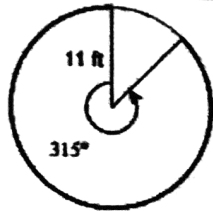
Arc Length



ARC LENGTH:

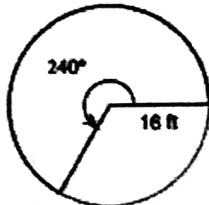


SECTOR AREA:

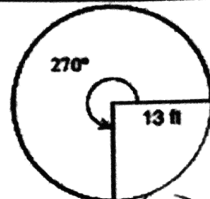
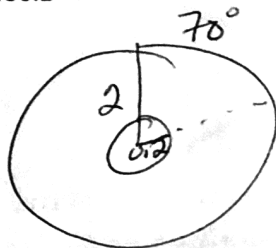


60.5 feet

Find the sector area



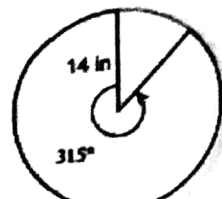
A = 536.2



$$\frac{270}{360} \cdot 2\pi(13)$$

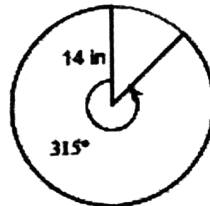
$$19.5\pi \text{ or } 61.26$$

Sector area:



$$\frac{315}{360} \cdot 2\pi(14)$$

$$24.5\pi \text{ or } 76.97$$



$$\frac{315}{360} \pi (14)^2$$

$$171.5\pi \text{ or } 538.78$$

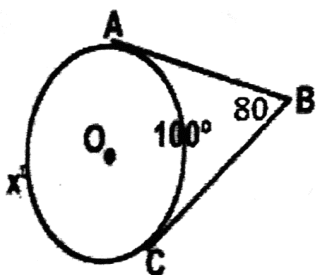
You are eating a doughnut. The missing circle in the middle has a radius of 0.2 inches. The entire doughnut has a radius of two inches. Your first bite takes 70 degrees out of the circle. What is the remaining area of the doughnut?

$$\frac{250}{360} \left((2)^2 \pi - (.2)^2 \pi \right)$$

$$3.19\pi \text{ or } 10.02$$

$$m\angle ABD = \frac{1}{2}(m\widehat{AD} - m\widehat{AC})$$

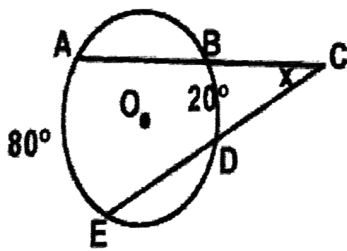
(big arc) - (small arc) = 2(angle)



simplify
add

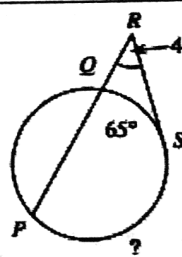
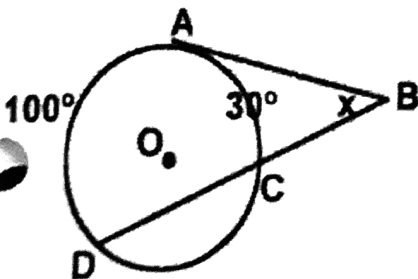
simplify

divide



simplify

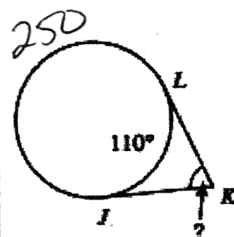
divide



$$44 = \frac{1}{2}(x - 65)$$

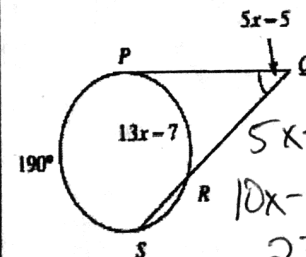
$$88 = x - 65$$

$$x = 153^\circ$$



$$x = \frac{1}{2}(250 - 110)$$

$$x = 70^\circ$$

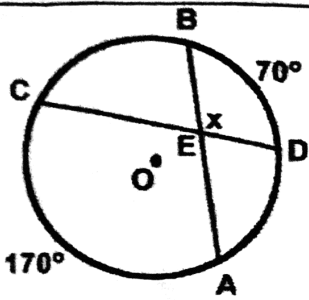


$$5x - 5 = \frac{1}{2}(190 - (13x - 7))$$

$$10x - 10 = 190 - 13x + 7$$

$$23x = 207$$

$$x = 9$$

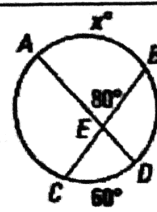


Angle Formed Inside by Two Chords =
 $\frac{1}{2}$ Sum of Intercepted Arcs

$$m\angle BED = \frac{1}{2}(m\widehat{AC} + m\widehat{BD})$$

OR

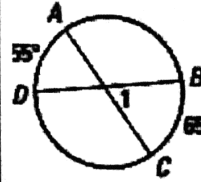
simplify
 divide



$$80 = \frac{1}{2}(x + 60)$$

$$160 = x + 60$$

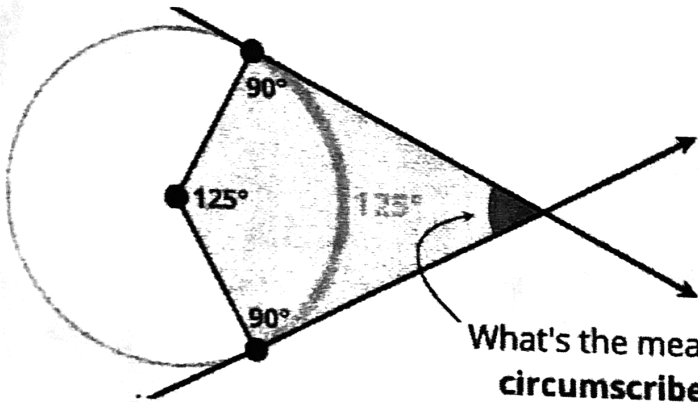
$$100 = x$$



$$m\angle I = \frac{1}{2}(55 + 65)$$

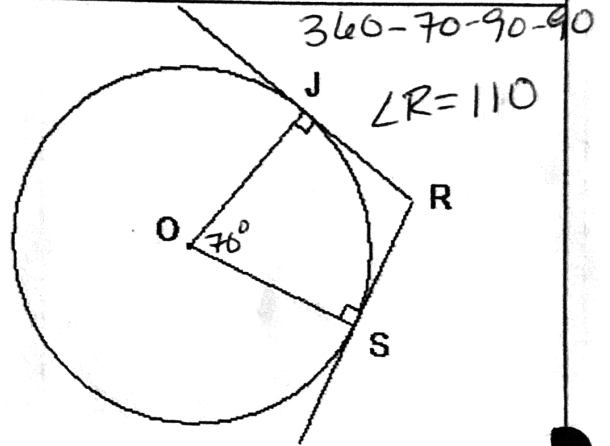
$$m\angle I = 60^\circ$$

A circumscribed angles and their arcs are always supplementary.



What's the measure of the circumscribed angle?

subtract



$$360 - 70 - 90 - 90$$

$$\angle R = 110$$

Find angle R if angle O is 70 degrees.