

7.8 Inscribed angle theorem

1. Do Now: A square is inscribed in a circle with a radius $r = 6$. Find each:

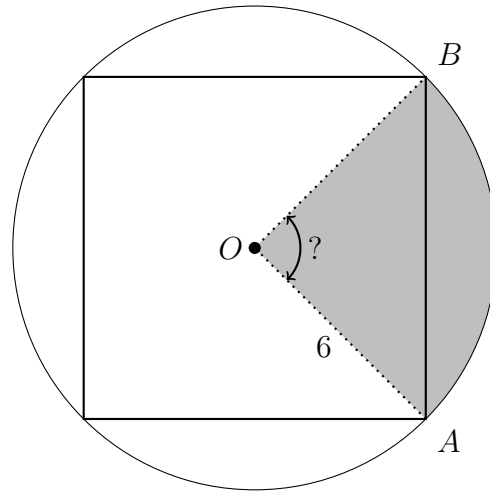
(a) $m\angle AOB$

(b) The circle circumference. ($C = 2\pi r$)

(c) The length of the arc \widehat{AB}

(d) The circle's area. ($A = \pi r^2$)

(e) The sector area (in gray)

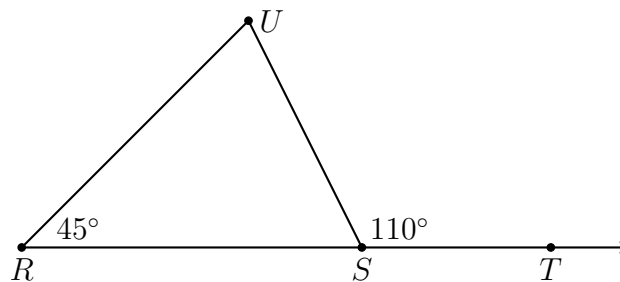


2. Given $m\angle R = 45$ and $m\angle UST = 110$.

(a) Are $\angle RSU$ and $\angle UST$ supplementary, complementary, or neither?

(b) Find $m\angle RSU$.

(c) Find $m\angle U$.



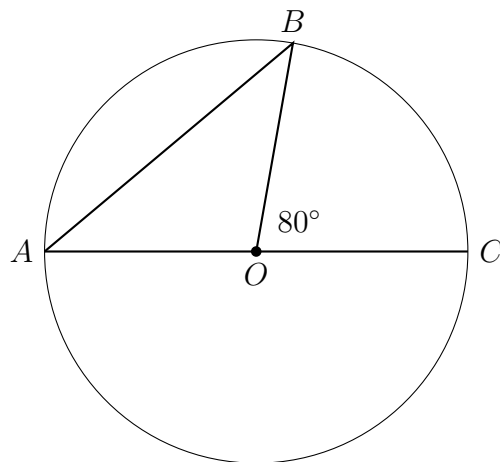
3. Do Now: Given circle O , diameter \overline{AC} , radius \overline{BO} , and central angle $m\angle BOC = 80^\circ$.

(a) How do we know $\overline{AO} \cong \overline{BO} \cong \overline{CO}$?

(b) What is the degree measure $m\widehat{BC}$?

(c) Find $m\angle AOB$.

(d) How do we know $\angle A \cong \angle B$?

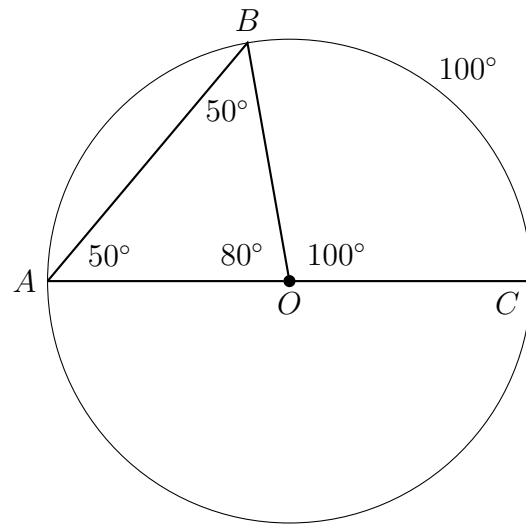


4. Lesson: Given circle O , with inscribed angle $\angle BAC$ and central angle $\angle BOC$ having the same intercepted arc, $m\widehat{BC} = 100^\circ$.

(a) $m\angle BOC = 100^\circ$ and therefore
 $m\angle AOB = 80^\circ$ (linear pair)

(b) $\triangle AOB$ is isosceles therefore
 $m\angle A = m\angle B = 50^\circ$

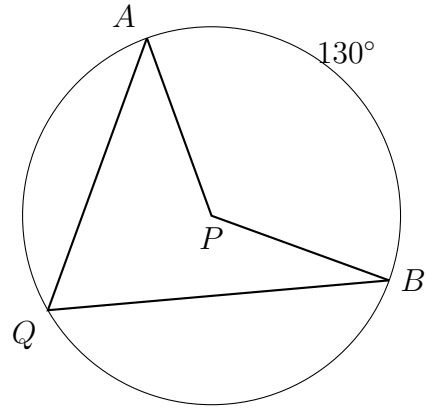
- (c) Theorem:
The measure of an inscribed angle is *half* of the measure of its intercepted arc.



5. Given circle P with $m\widehat{AB} = 130^\circ$.

(a) Write down the $m\angle APB$.

(b) Find the $m\angle AQB$.



6. What is the equation of a circle with center $(-2, 5)$ and radius $r = 4$?

Graph the circle in Graspable Math or Geogebra and paste the image here.

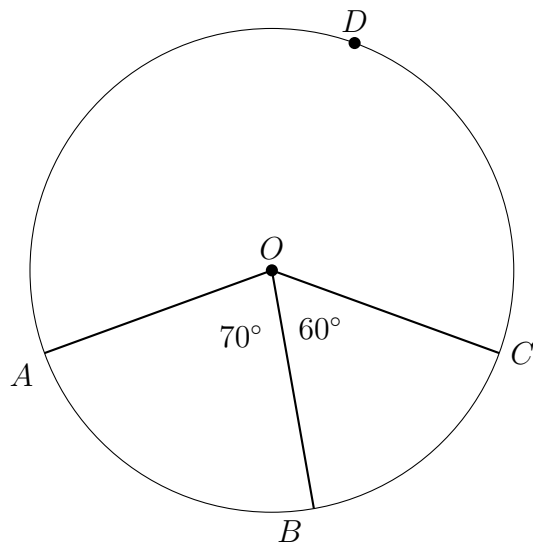
7. Given circle O with points on the circle A, B, C, D as shown. Find each central angle measure.

(a) $m\angle AOB =$

(b) $m\angle BOC =$

(c) $m\angle AOC =$

- (d) What is the measure of the *reflex angle* $m\angle AOC =$, i.e. the one containing point D that is $> 180^\circ$



8. Lesson: Any portion of the circumference of a circle is called an *arc* and written \widehat{AB} .

A *sector* is part of a circle (“pie slice”) bounded by two radii and an arc.

(a) Highlight arc \widehat{AB} .

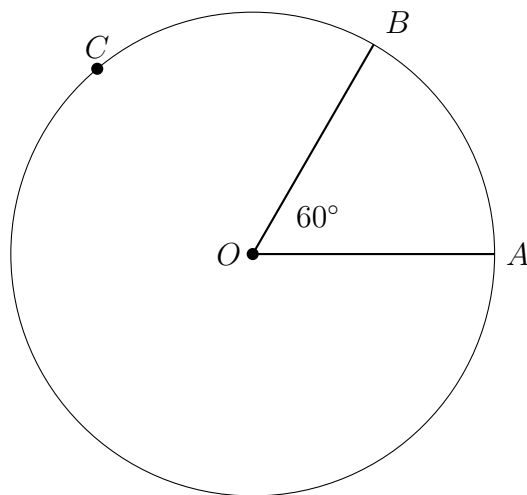
(b) An arc’s degree measure equals its corresponding central angle measure.

If $m\angle AOB = 60^\circ$, what is the $m\widehat{AB}$?

(c) A *semicircle* is half of a circle.

(d) An arc smaller than half a circle is a *minor* arc, one larger is a *major* arc.

Which is a major arc, \widehat{AB} or \widehat{ACB} ?

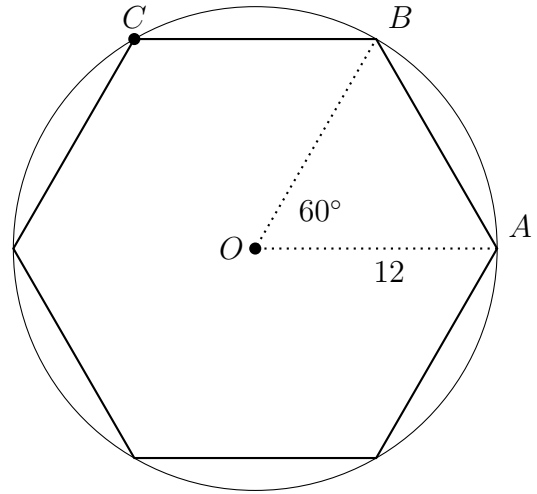


9. A regular hexagon is inscribed in a circle with a radius $r = 12$, as shown.

(a) Find the circumference of the circle in terms of π . ($C = 2\pi r$)

(b) How long is the curved part of the circle from point A to B , \widehat{AB} ?

(c) What is the degree measure of the arc from point A to C , $m\widehat{AC}$?

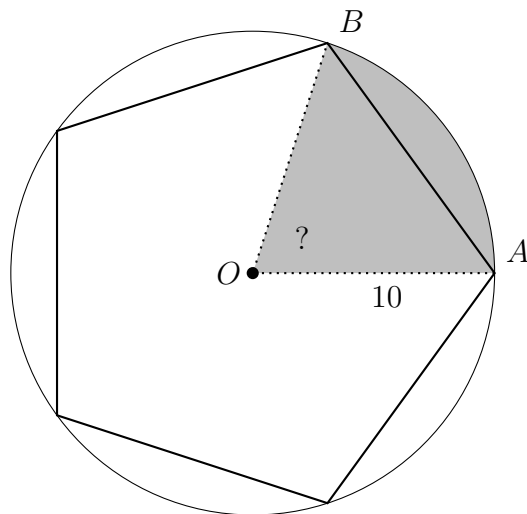


10. A regular pentagon is inscribed in a circle with a radius $r = 10$, as shown.

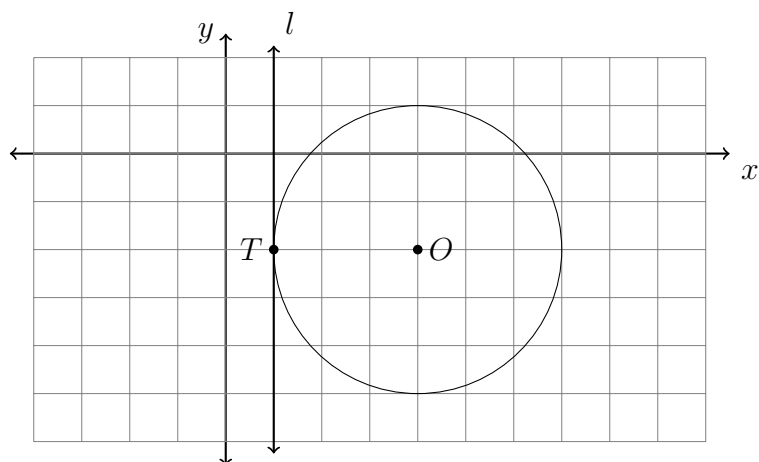
- (a) Find the circle's area in terms of π .
($A = \pi r^2$)

- (b) What is the degree measure of the central angle $\angle AOB$?

- (c) What is the area of the sector bounded by \overline{AO} , \overline{BO} , and \widehat{AB} ?



11. What is an equation of circle O shown in the graph below?



(a) $(x - 4)^2 + (y + 2)^2 = 9$

(c) $(x + 2)^2 + (y - 4)^2 = 9$

(b) $(x - 4)^2 + (y + 2)^2 = 9^2$

(d) $(x + 2)^2 + (y - 4)^2 = 9^2$

Write down the coordinates of the point of tangency T and the equation of the tangent line l .

12. What are the coordinates of the center and the length of the radius of the circle whose equation is $(x - 4)^2 + (y + 3)^2 = 16$?
- (a) center $(-4, 3)$ and radius 8
 - (b) center $(4, -3)$ and radius 4
 - (c) center $(-4, 3)$ and radius 4
 - (d) center $(4, -3)$ and radius 8

13. What is the equation of a circle with center $(5, 0)$ and radius $r = 5$?

Graph the circle in Graspable Math or Geogebra and paste the image here.

14. Given the diameter of circle C is \overline{AB} , $A(3, 2)$ and $B(9, 10)$, find the length of \overline{AB} and hence, the radius of the circle.

Find the equation of the circle. Graph the circle and its diameter.