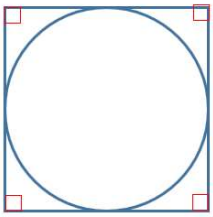
Formal Geometry **9.1 Notes: Radius, Diameter, and Circumference of a Circle**

Circumference of a Circle: $C = 2\pi r$ or $C = d\pi$

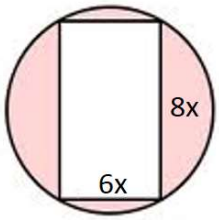
Ex 1: Find the radius and diameter of a circle with circumference of 17.

Ex 2: Find the exact circumference of the circle.



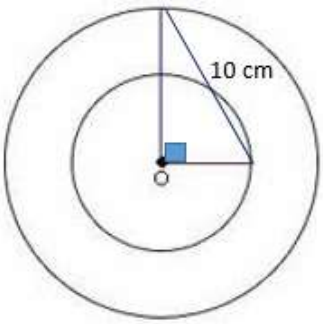
12 cm

Ex 3: Find the exact circumference of the circle, in terms of x.

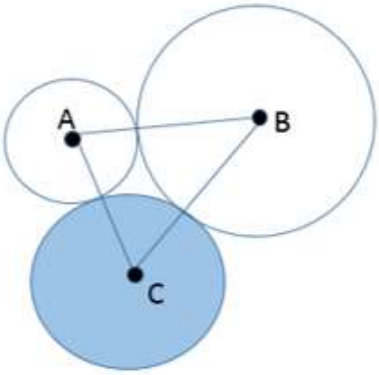


Concentric Circles:
Two coplanar circles sharing the same center.

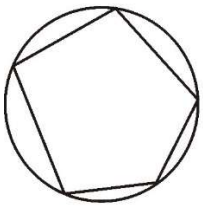
Ex 4: Find the circumference of the larger circle if the radius of the smaller circle is 5 cm. The circles are concentric.



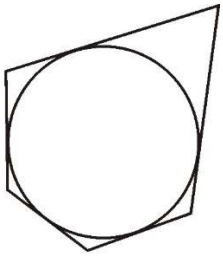
Ex 5: Find the radius of each circle, if AB = 8, BC = 7, and AC = 6.



Circumscribed and Inscribed Circles



inscribed polygon



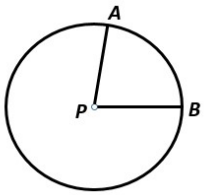
circumscribed polygon

Theorem: All radii of a circle are _____.

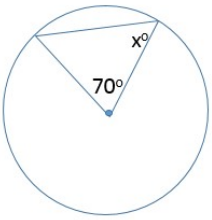
Key Concept: The **sum of the central angles** of a circle = _____°.

Central Angle:

If an angle is a central angle then its vertex is the center of the circle and its sides contain two radii of the circle.

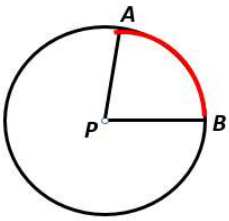


Ex.1 Identify the central angle and find x.



An **arc** is a portion of a circle defined by two _____.

Each central angle separates a circle into two arcs with measures related to the central angle.

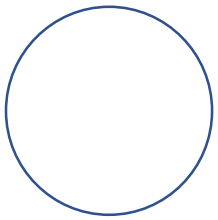


Types of Arcs:

Arc	Measure
***A MINOR ARC** is the shortest arc between 2 pts on a circle.*	
***A MAJOR ARC** is the longest arc between 2 points on a circle.*	
***A SEMICIRCLE** is an arc with endpoints that lie on a diameter.*	

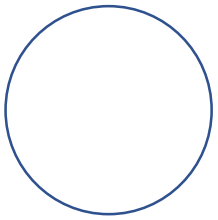
Congruent Arcs:

In the same circle or in congruent circles, two minor arcs are congruent if and only if their central angles are congruent.



Arc Addition Postulate:

The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.



Arc Length

The length of an arc is the distance between the endpoints along an arc measured in a linear value.

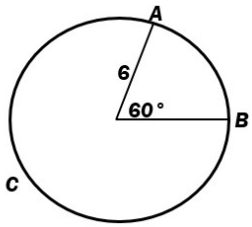
It is a fraction of the circumference: $\ell = \frac{m}{360} \bullet 2\pi r$

Ex. 2 Use the diagram to find the following:

a) Measure of minor arc AB.

b) Measure or major arc AB.

c) Length of minor arc AB.



Ex.3

Find the measure of each arc

7. $m\widehat{BC}$

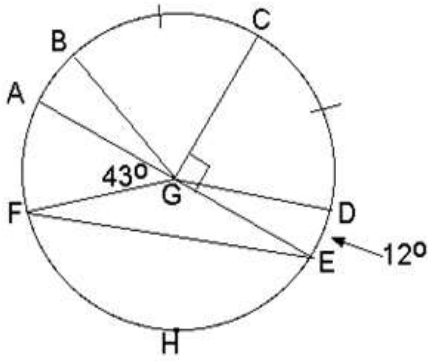
8. $m\widehat{FHE}$

9. $m\widehat{CD}$

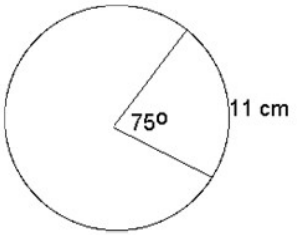
10. $m\widehat{CEF}$

11. $m\widehat{CAE}$

12. $m\widehat{ECA}$

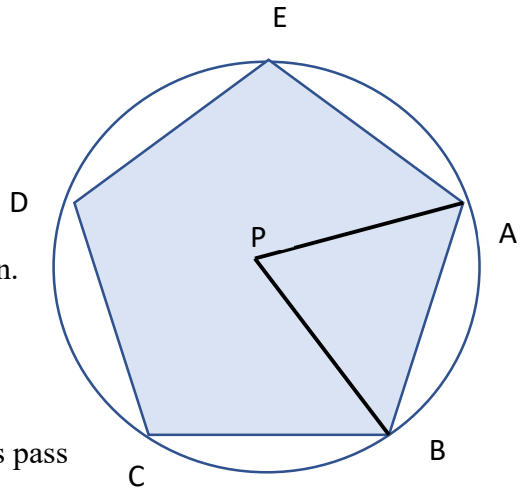


Ex.4 Find the circumference of the circle.



10.4 Notes: Areas of Regular Polygons and Composite Figures

The center and radius of a regular polygon is also the center and radius of its circumscribed circle.



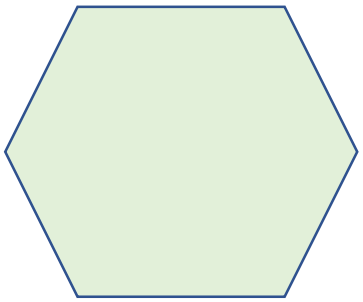
Center: Radius:

Apothem: A segment drawn perpendicular to a side of a regular polygon.

The central angle has its vertex at the center of the polygon and its sides pass through consecutive vertices of the polygon.

Measure of a central angle of a regular polygon:

Example 1: What is the area of a regular hexagon with side lengths 10 inches? Give both the exact answer and an approximate answer rounded to two decimal places.



Area Formula of a Regular Polygon:

Example 2: Find the area of a regular hexagon whose perimeter is 30 cm. Exact answer.

Example 3: Find the area of a square with an apothem of 4 inches. Exact answer.

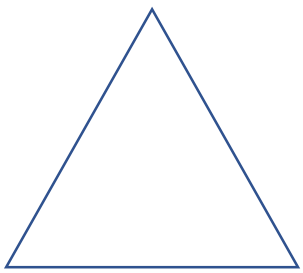
Example 4: Find the area of an equilateral triangle with a radius of 12 cm. Exact answer.

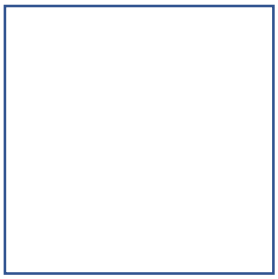
Example 5: Find the area of a regular hexagon whose side length is $20\sqrt{5}$ cm. Exact answer.

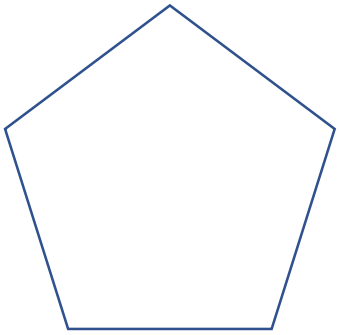
Example 6: Find the area of a decagon with a side length of 4 inches. Round to the nearest tenth.

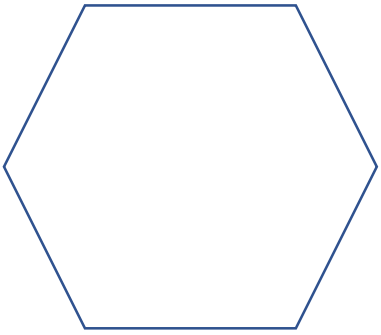
Example 7: Find the area of an octagon with a radius of 12 cm. Round to the nearest hundredth.

Summary of angles in common regular polygons:

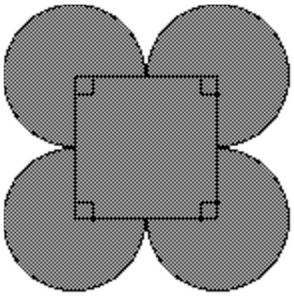




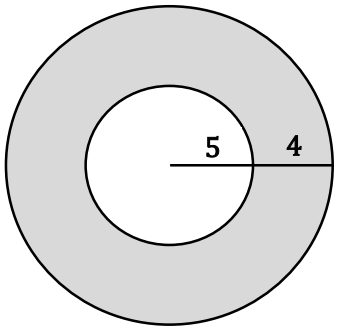




Example 8: Find the area of the shaded region if the radius of each circle is 6 cm.



Example 9: Find the area of the shaded region.



Example 10: Find the area of the shaded region if the quad is a square, and the arcs are ≅.

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