

Name: _____

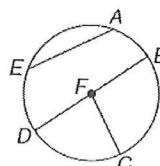
Key

ACC GEOMETRY 10.1-10.2

Parts of Circles A circle consists of all points in a plane that are a given distance, called the **radius**, from a given point called the **center**.

A segment or line can intersect a circle in several ways.

- A segment with endpoints that are the center of the circle and a point of the circle is a **radius**.
- A segment with endpoints that lie on the circle is a **chord**.
- A chord that contains the circle's center is a **diameter**.



chord: \overline{AE} , \overline{BD}
radius: \overline{FB} , \overline{FC} , \overline{FD}
diameter: \overline{BD}

Example 1:

a. Name the circle.

⊙O

b. Name a radius of the circle.

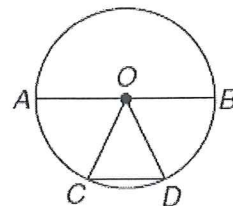
OA, OB, OD, OC

c. Name the chords of a circle.

AB, CD

d. Name the diameter of the circle.

AB



Circumference The **circumference** of a circle is the distance around the circle.

Circumference	For a circumference of C units and a diameter of d units or a radius of r units, $C = \pi d$ or $C = 2\pi r$.
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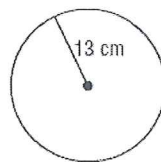
Example

Find the circumference of the circle to the nearest hundredth.

$$C = 2\pi r \quad \text{Circumference formula}$$

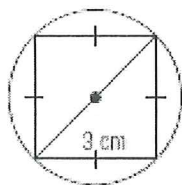
$$= 2\pi(13) \quad r = 13$$

$$\approx 81.68 \quad \text{Use a calculator.}$$



The circumference is about 81.68 centimeters.

Example 2: Find the circumference. use exact values.



$$C = d \cdot \pi \quad d = 3\sqrt{2} \text{ cm}$$

$$C = 3\sqrt{2}\pi \text{ cm}$$

Example 4: If the diameter of a circle is 6, find the radius and circumference.

$$d = 6 \quad r = 3$$

$$C = 6\pi \text{ units}$$

Example 5: Find the circumference of the circle.

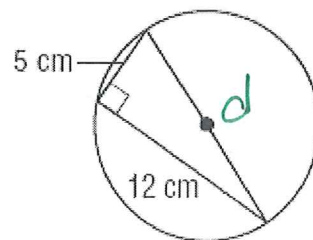
Find d .

$$5^2 + 12^2 = d^2$$

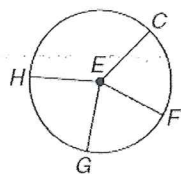
$$C = d\pi \text{ or } 2\pi r$$

$$d = 13 \text{ cm}$$

$$C = 13\pi \text{ cm}$$



Angles and Arcs A central angle is an angle whose vertex is at the center of a circle and whose sides are radii. A central angle separates a circle into two arcs, a major arc and a minor arc.



\widehat{GF} is a minor arc.
 \widehat{CHG} is a major arc.
 $\angle GEF$ is a central angle.

Here are some properties of central angles and arcs.

- The sum of the measures of the central angles of a circle with no interior points in common is 360.
- The measure of a minor arc equals the measure of its central angle.
- The measure of a major arc is 360 minus the measure of the minor arc.
- Two arcs are congruent if and only if their corresponding central angles are congruent.
- The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs. (Arc Addition Postulate)

$$m\angle HEC + m\angle CEF + m\angle FEG + m\angle GEH = 360$$

$$m\widehat{CF} = m\angle CEF$$

$$m\widehat{CGF} = 360 - m\widehat{CF}$$

$$\widehat{CF} \cong \widehat{FG} \text{ if and only if } \angle CEF \cong \angle FEG.$$

$$m\widehat{CF} + m\widehat{FG} = m\widehat{CG}$$

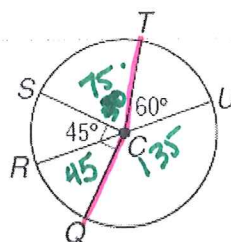
Find each measure.

$$1. m\angle SCT = 75^\circ$$

$$3. m\angle SCQ = 90^\circ$$

$$2. m\angle SCU = 75 + 60 = 135^\circ$$

$$4. m\angle QCT = 45 + 45 + 75 = 165^\circ$$



In $\odot O$, $m\angle BOA = 44$. Find each measure.

$$5. m\widehat{BA} = \angle BOA = 44^\circ$$

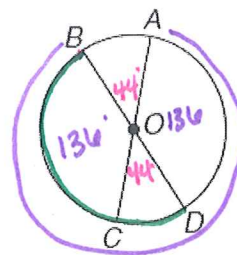
$$7. m\widehat{CD} = 44^\circ$$

$$9. m\widehat{BCD} = \text{Semi circle} = 180^\circ$$

$$6. m\widehat{BC} = \angle COB = 136^\circ$$

$$8. m\widehat{ACB} = 136 + 44 + 136 = 316^\circ$$

$$10. m\widehat{AD} = 136^\circ$$



Arc Length: Portion of the circle \circ circumference

$$L = \frac{a}{360} \cdot C$$

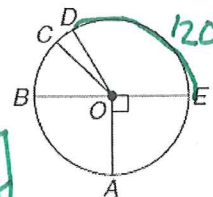
Examples:

The diameter of $\odot O$ is 24 units long. Find the length of each arc for the given angle measure. Round to the nearest tenth.

$$d = 24$$

$$1. \widehat{DE} \text{ if } m\angle DOE = 120$$

$$L = \frac{120}{360} \cdot 24\pi = \frac{2880}{360}\pi = 8\pi \text{ units} = 8$$



The diameter of $\odot P$ is 15 units long and $\angle SPT \cong \angle RPT$. Find the length of each arc for the given angle measure. Round to the nearest tenth.

$$d = 15$$

$$2. \widehat{RT} \text{ if } m\angle SPT = 70$$

$$\frac{70}{360} \cdot 15\pi = \frac{1050}{360}\pi = \frac{35\pi}{12} = 8$$

$$3. \widehat{NR} \text{ if } m\angle RPT = 50$$

$$\frac{50}{360} \cdot 15\pi = \frac{750}{360}\pi = \frac{10\pi}{3} \text{ units}$$

