# Circles

**Know these terms**: radius, diameter, arc, tangent, secant, inscribed, circumscribed, minor arc and major arc.

**Circumference** = $\pi d$ or $2\pi r$

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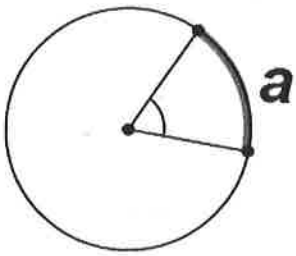
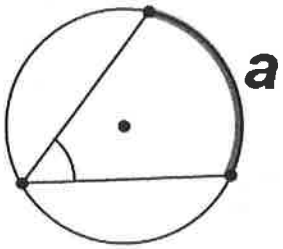
## Angles

### Central Angles

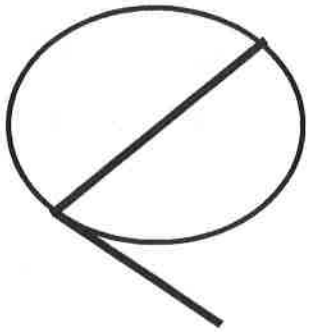



$\angle = a$

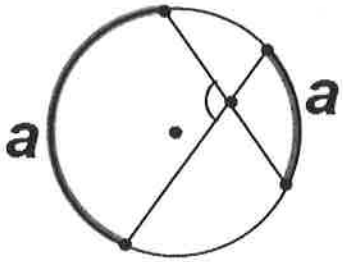
### Inscribed Angles



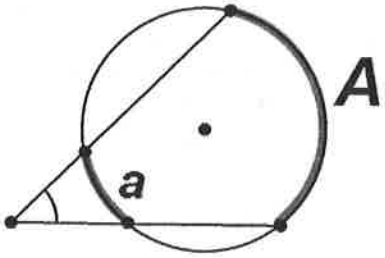

$\angle = \frac{1}{2}a$



### Interior Angles




### Exterior Angles

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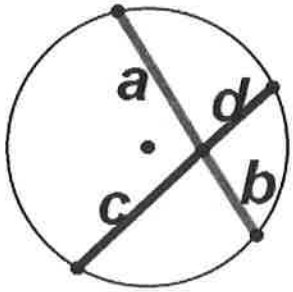
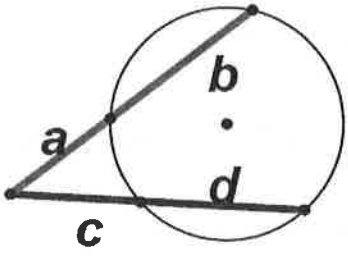
## Segments

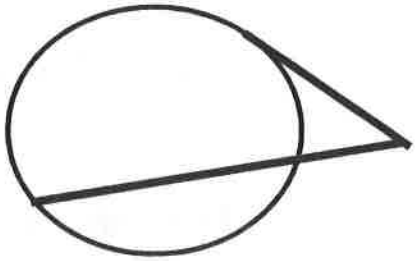



$(a)(b) = (c)(d)$



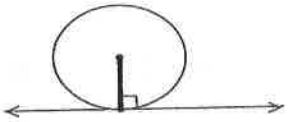

$(a)(a+b) = (c)(c+d)$

(outside)(whole) = (outside)(whole)

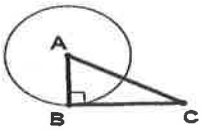


$a^2 = b(b + c)$

Tangent ⊥ radius



$(AB)^2 + (BC)^2 = (AC)^2$

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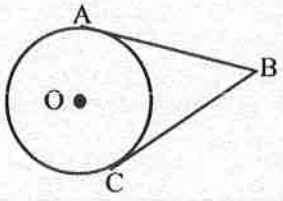


IF: $\overline{AB}$ is a tangent to circle $O$ at $A$

$\overline{CB}$ is a tangent to circle $O$ at $C$

THEN: $\overline{AB} \cong \overline{CB}$

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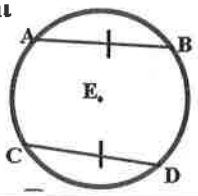
**corresponding minor arcs are congruent**
**vice versa.**

If AB = CD, then $\overset{\frown}{AB} \cong \overset{\frown}{CD}$

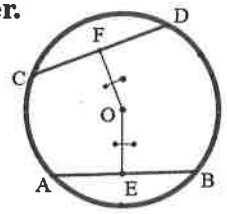
If $\overset{\frown}{AB} \cong \overset{\frown}{CD}$ , then AB = CD




**y are equidistant from the center.**

$\overline{CD} \cong \overline{AB}$ *iff* $\overline{OF} \cong \overline{OE}$

**nple:** If AB = 5 cm, find CD.

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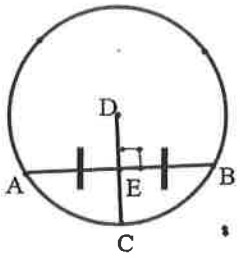
**hord, then it bisects the chord and its arc.**

*If* $\overline{DC} \perp \overline{AB}$ *then* $\overline{DC}$ *bisects* $\overline{AB}$ *and* $\overset{\frown}{AB}$

$\therefore \overline{AE} \cong \overline{BE}$ *and* $\overset{\frown}{AC} \cong \overset{\frown}{BC}$

**:ample:** If AB = 5 cm, find AE.

*If m.* $\overset{\frown}{AB} = 120°$, *find m* $\overset{\frown}{AC}$

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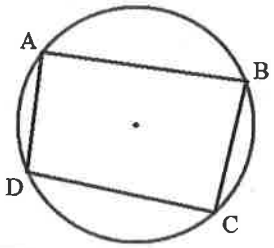
If a quadrilateral is inscribed in a circle, then the opposite angles are supplementary.




$m\angle DAB + m\angle DCB = 180°$

$m\angle ADC + m\angle ABC = 180°$

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**Equation of a Circle** $(x - h)^2 + (y - k)^2 = r^2$

**Center (h, k)** **Radius = r**

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**Finding the length of an arc:** $\frac{\text{Arc degree}}{360} = \frac{\text{Arc length}}{\pi d}$