

Circles and Circumference

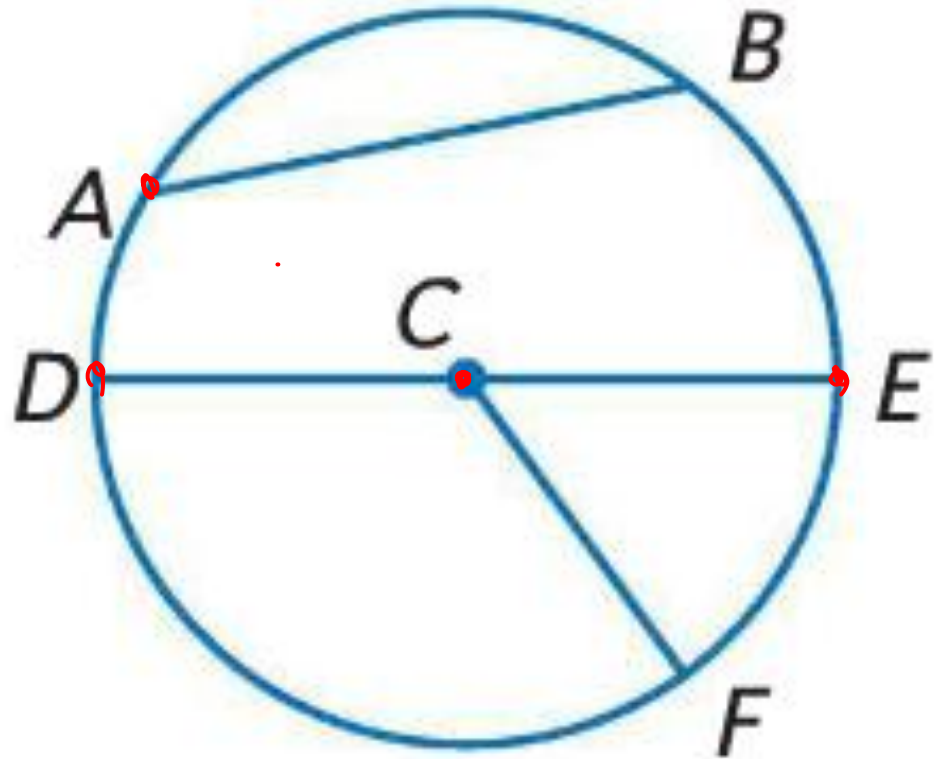
Circles

- A circle is a locus or set of all points in a plane equidistant from a given point called the center of the circle.
- A circle is usually named by its center point.
- All circles are similar.

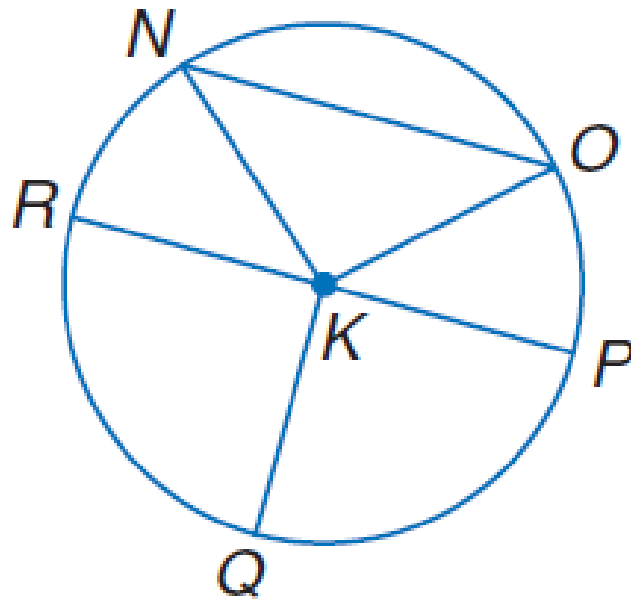
Special Segments in a Circle

- Radius – a segment with endpoints at the center and on the circle.
- Chord – a segment with endpoints on the circle.
- Diameter – a chord that passes through the center and is made up of collinear radii.

Special Segments in a Circle

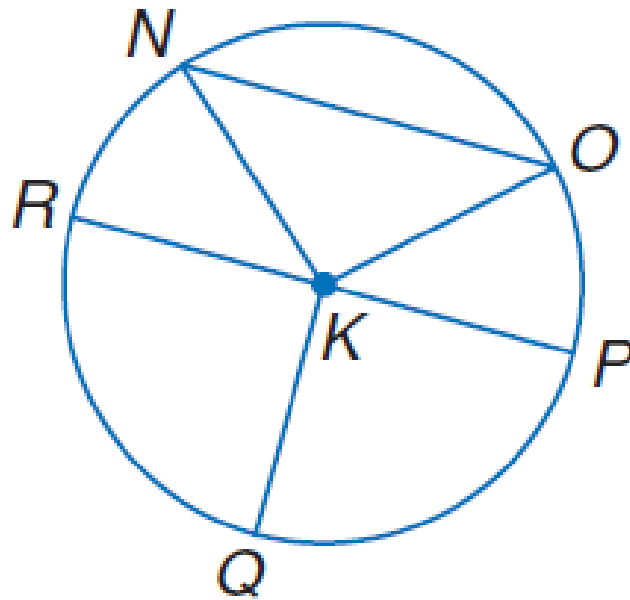


Examples



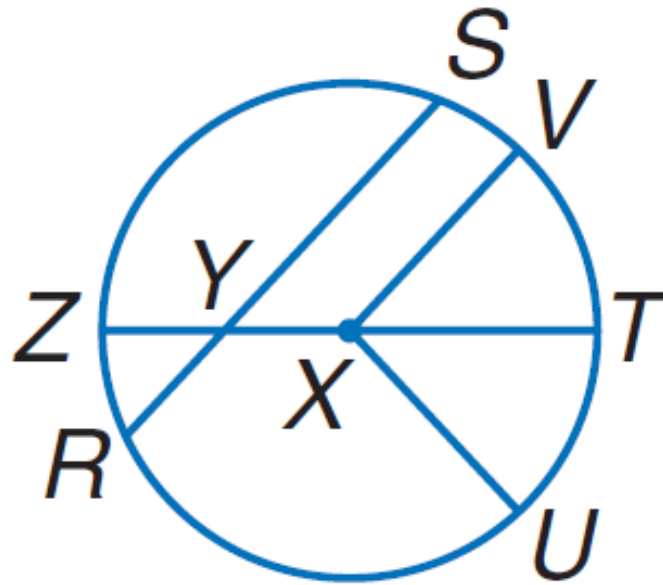
- Name the circle. K
- Name a radius of the circle. KP, KO, KQ, KN, KR
- Name a chord of the circle. RP, NO
- Name a diameter of the circle. RP

Examples



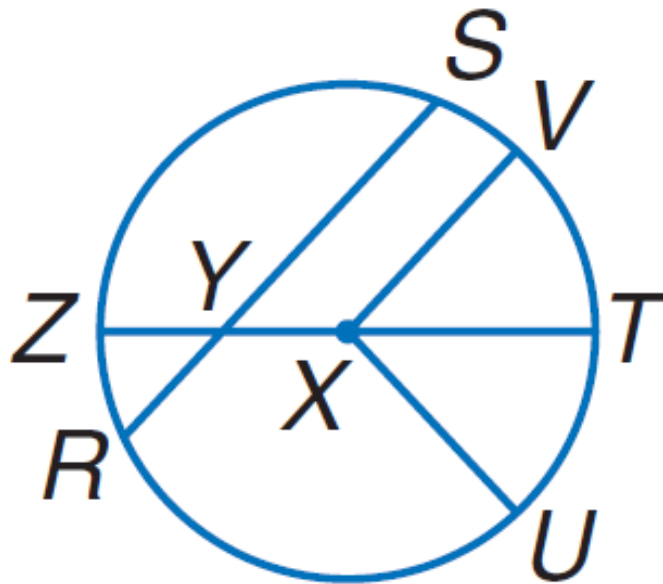
- Name the circle. **K**
- Name a radius of the circle. **KR, KN, KO, KP, KQ**
- Name a chord of the circle. **NO, RP**
- Name a diameter of the circle. **RP**

Examples



- Name the circle. X
- Name a radius of the circle. XT, XV, XU, XZ
- Name a chord of the circle. RS, ZT
- Name a diameter of the circle. ZT

Examples



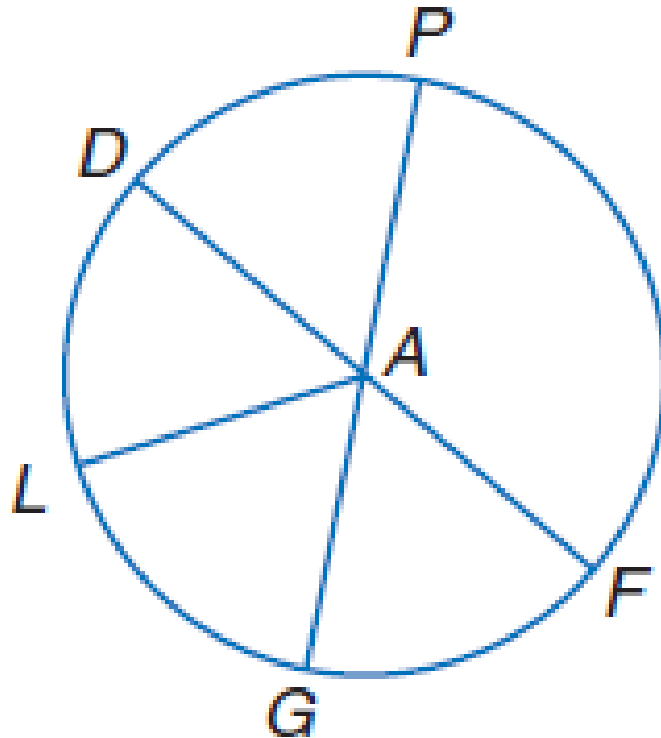
- Name the circle. **X**
- Name a radius of the circle. **XZ, XV, XT, XU**
- Name a chord of the circle. **SR, ZT**
- Name a diameter of the circle. **ZT**

Radius and Diameter

- By definition, the distance from the center to any point on a circle is always the same. Therefore, all radii r are congruent.
- A diameter d is composed of two radii, so all diameters are congruent.
- Thus, $d = 2r$ and $r = \frac{d}{2}$ or $\frac{1}{2}d$.

Examples

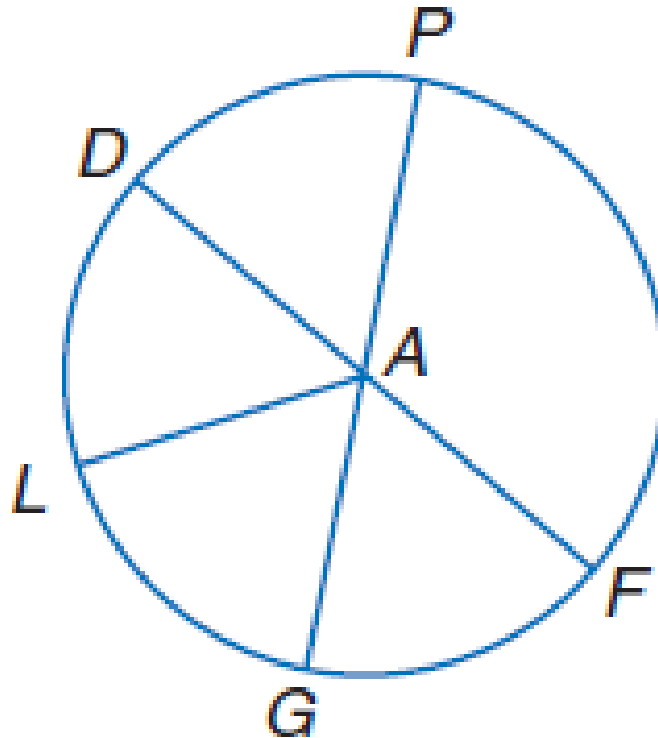
- Circle A has diameters \overline{DF} and \overline{PG} .
- If $PA = 7$, find PG . *14*



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Examples

- Circle A has diameters \overline{DF} and \overline{PG} .
- If $PA = 7$, find PG .



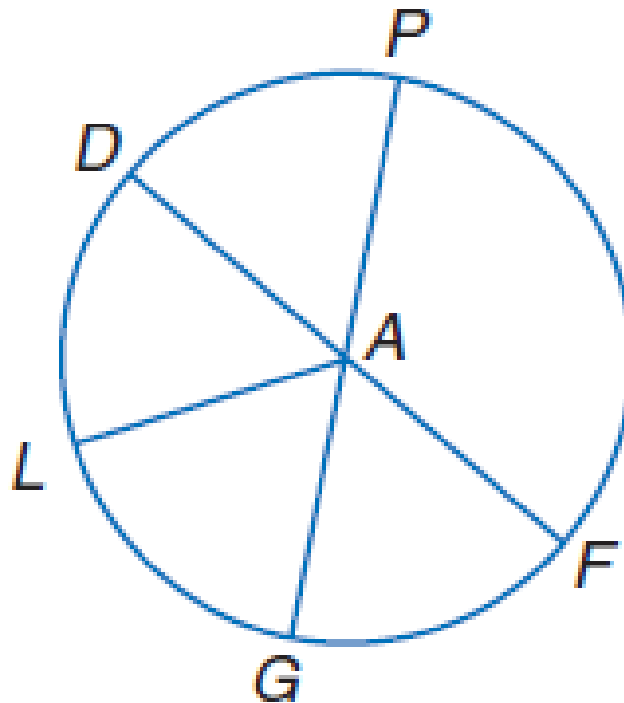
$$PG = 2 * PA$$

$$PG = 2 * 7$$

$$PG = 14$$

Examples

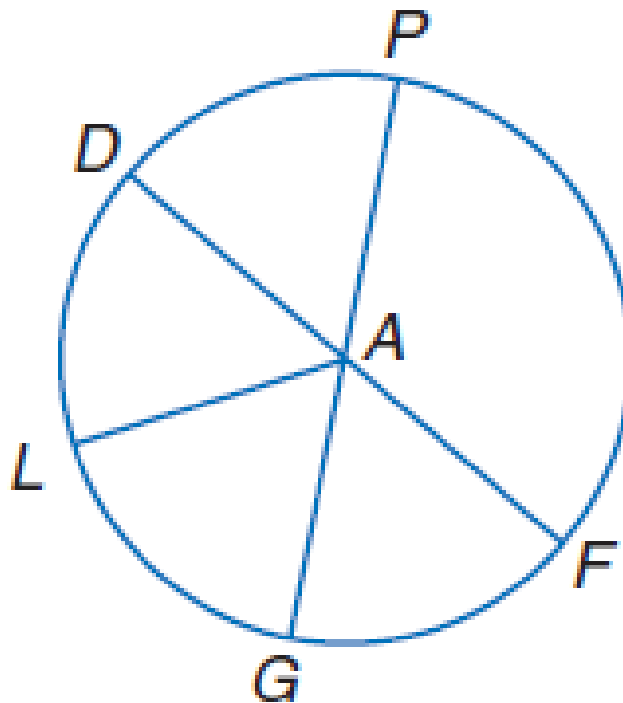
- Circle A has diameters \overline{DF} and \overline{PG} .
- If $PG = 15$, find DF . *15*



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Examples

- Circle A has diameters \overline{DF} and \overline{PG} .
- If $PG = 15$, find DF .



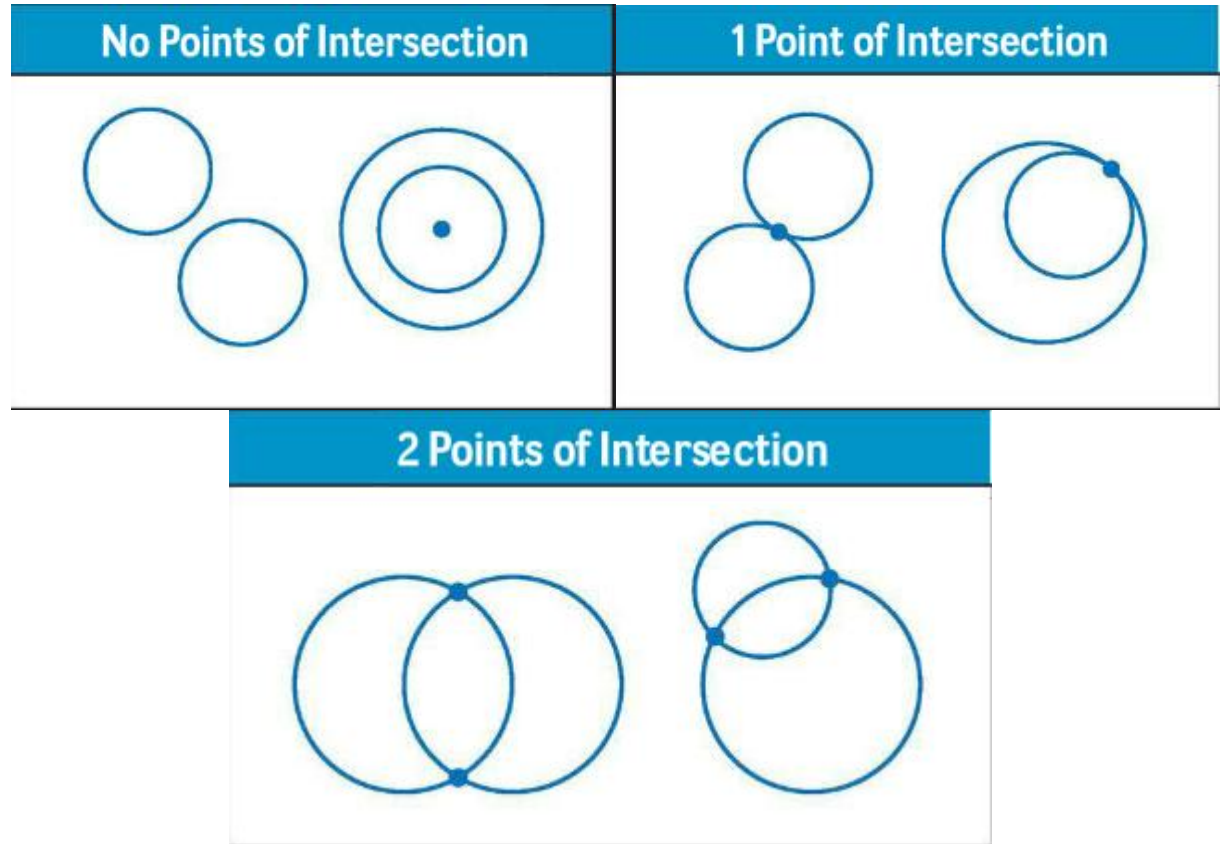
~~$PG = 2 * P$~~

~~$PG = 2 * 7$~~

~~$PG = 14$~~

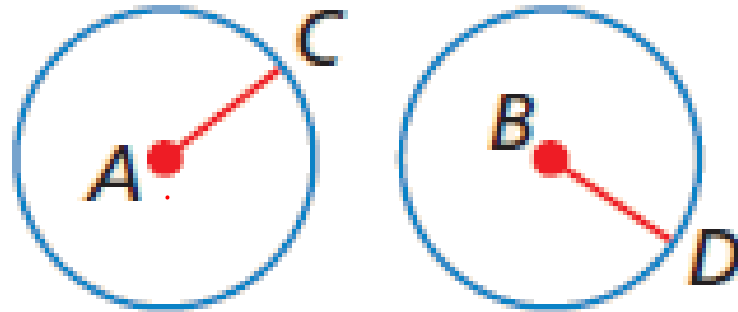
- Two circles can intersect in two different ways.

Circle Pairs



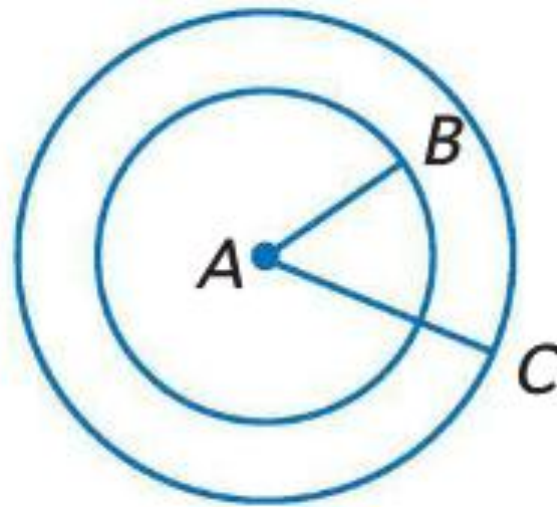
Circle Pairs

- Two circles are congruent if and only if they have congruent radii.



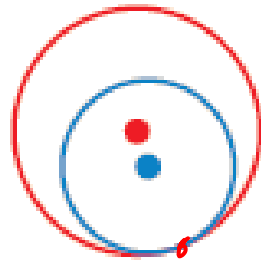
Concentric Circles

- Concentric circles are coplanar circles that have the same center.

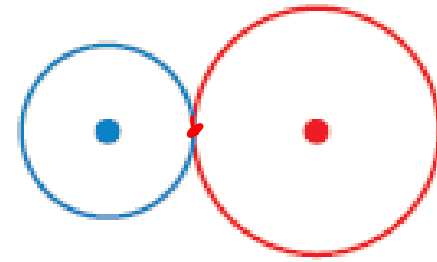


Tangent Circles

- Two coplanar circles that intersect at exactly one point are called tangent circles.



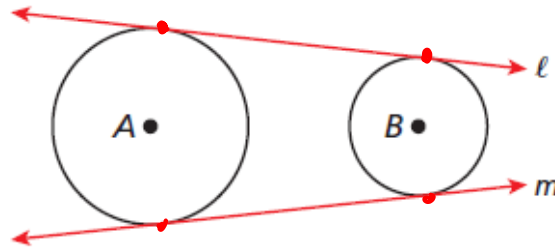
**Internally
tangent circles**



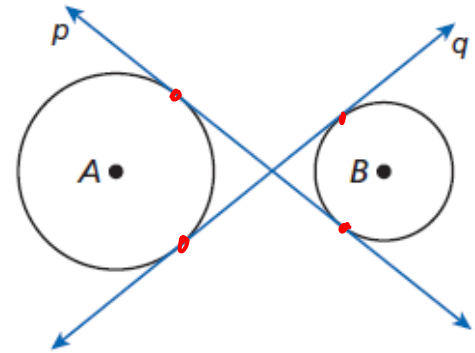
**Externally
tangent circles**

Tangent Circles

- A common tangent is a line that is tangent to two circles.



Lines ℓ and m are common external tangents to $\odot A$ and $\odot B$.



Lines p and q are common internal tangents to $\odot A$ and $\odot B$.

Circumference

- The circumference of a circle is the distance around the circle. If a circle has a diameter d or radius r , the circumference C equals the diameter times pi or twice the radius times pi.

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

Examples

exact $\rightarrow \pi$

3.14 \rightarrow round

$\frac{22}{7} \rightarrow$ Fraction

- Find C if $r = 7$ cm.
$$C = 2\pi r$$
$$= 2\pi 7$$
$$= 14\pi$$

- Find C if $d = 12.5$ in.
$$C = \pi d$$
$$= 12.5\pi$$

Examples

- Find C if $r = 7$ cm.
- $C = 2\pi r$
- $C = 2\pi(7)$
- $C = 14\pi$ or 43.98 cm

- Find C if $d = 12.5$ in.
- $C = \pi d$
- $C = \pi(12.5)$
- $C = 12.5\pi$ or 39.27 in

Examples

- Find d and r to the nearest hundredth if $C = 136.9$ meters.

$$C = \pi d$$

$$\frac{136.9}{\pi} = \frac{\pi d}{\pi}$$

$$= d$$

$$C = 2\pi r$$

$$\frac{136.9}{(2\pi)} = \frac{2\pi r}{2\pi}$$

$$= r$$

UBE → Parentheses!

Examples

- Find d and r to the nearest hundredth if $C = 136.9$ meters.
- $C = \pi d$
- $136.9 = \pi d$
- $\frac{136.9}{\pi} = d$
- $43.58 \text{ m} = d$
- $r = \frac{1}{2}d$
- $r = \frac{1}{2}(43.58)$
- $r = 21.79 \text{ m}$