

9.1 Examples Geo done

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EQ: Can you identify and use parts of circles and solve problems using circumference?

How are you doing? Write answer next to Essential Question

1. I don't understand the material
2. I understand a little.
3. I understand this material.
4. I could teach this to someone



Summary: At least 3 sentences...

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KEY TERMS

Circle - The locus or set of all points in a plane equidistant from a given point called the center.

Coplanar - Points that lie in the same plane.

Circumference - The distance around a circle.

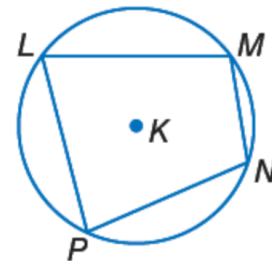
pi (π) - An irrational number that is the ratio of Circumference.
Diameter

π key or 3.14

Inscribed - A polygon is inscribed in a circle if all of its vertices lie on the circle.

Circumscribed - A circle is circumscribed about a polygon if it contains all of the vertices of the polygon.

- Quadrilateral LMNP is inscribed in circle K.
- Circle K is circumscribed about quadrilateral LMNP.



StudyTip

Levels of Accuracy

Since π is irrational, its value cannot be given as a terminating decimal. Using a value of 3 for π provides a quick estimate in calculations. Using a value of 3.14 or ~~3.14~~ provides a closer

approximation. For the most accurate approximation, use the π key on a calculator. Unless stated otherwise, assume that in this text, a calculator with a π key was used to generate answers.

StudyTip

Circumcircle A *circumcircle* is a circle that passes through all of the vertices of a polygon.

By definition, the distance from the center of a circle to any point on the circle is always the same. Therefore, all radii r of a circle are congruent. Since a diameter d is composed of two radii, all diameters of a circle are also congruent.

The segment connecting the centers of the two intersecting circles contains the radii of the two circles.

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KeyConcept Special Segments in a Circle

A **radius** (plural radii) is a segment with endpoints at the center and on the circle.

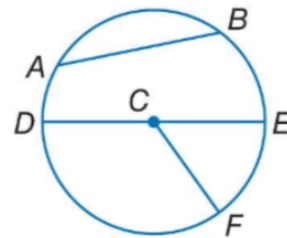
Examples \overline{CD} , \overline{CE} , and \overline{CF} are radii of $\odot C$.

A **chord** is a segment with endpoints on the circle.

Examples \overline{AB} and \overline{DE} are chords of $\odot C$.

A **diameter** of a circle is a chord that passes through the center and is made up of collinear radii.

Example \overline{DE} is a diameter of $\odot C$. Diameter \overline{DE} is made up of collinear radii \overline{CD} and \overline{CE} .



KeyConcept Radius and Diameter Relationships

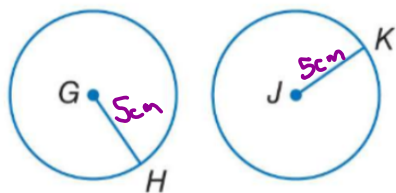
If a circle has radius r and diameter d , the following relationships are true.

Radius Formula $r = \frac{d}{2}$ or $r = \frac{1}{2}d$

Diameter Formula $d = 2r$

KeyConcept Circle Pairs

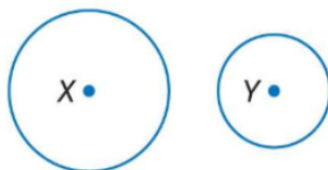
Two circles are congruent if and only if they have congruent radii.



Example $\overline{GH} \cong \overline{JK}$, so $\odot G \cong \odot J$.

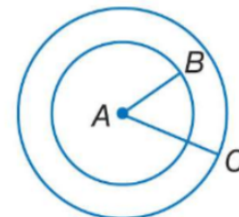
All circles are similar.

Same shape but not necessarily same size



Example $\odot X \sim \odot Y$

Concentric circles are coplanar circles that have the same center.



Example $\odot A$ with radius \overline{AB} and $\odot A$ with radius \overline{AC} are concentric.

Two circles can intersect in two different ways.

2 Points of Intersection	1 Point of Intersection	No Points of Intersection

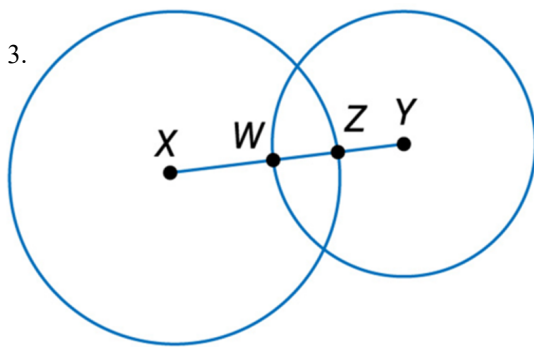
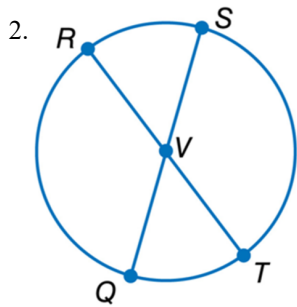
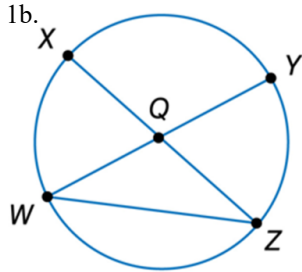
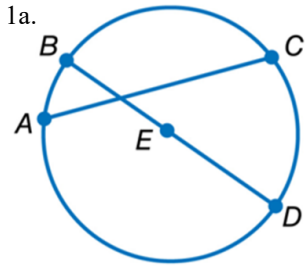
KeyConcept Circumference

Words If a circle has diameter d or radius r , the circumference C equals the diameter times pi or twice the radius times pi.

Symbols $C = \pi d$ or $C = 2\pi r$

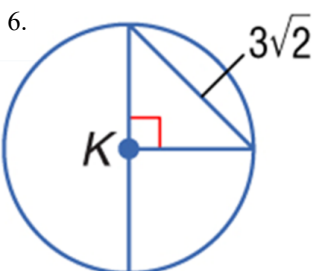
$$C = \pi d \quad \text{or} \quad C = 2\pi r$$

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4. **CROP CIRCLES** A series of crop circles was discovered in Alberta, Canada, on September 4, 1999. The largest of the three circles had a radius of 30 feet. Find its circumference.

5. Find the diameter and the radius of a circle to the nearest hundredth if the circumference of the circle is 65.4 feet.

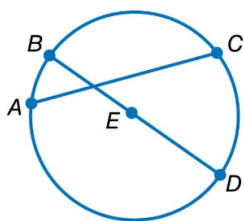


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Example 1

Identify Segments in a Circle

A. Name the circle and identify a radius.

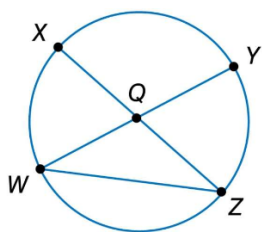


1a. Name: circle E
 $\odot E$
Radii: \overline{ED} , \overline{EB}

Example 1

Identify Segments in a Circle

B. Identify a chord and a diameter of the circle.



16. Chords: \overline{XZ} , \overline{WY} , \overline{WZ}

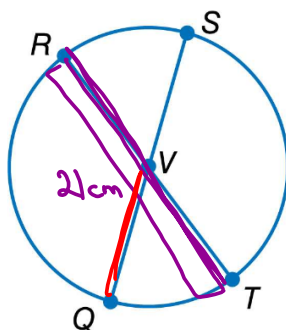
Diameters: \overline{WY} and \overline{XZ}

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Example 2

Find Radius and Diameter

If $RT = 21$ cm, what is the length of \overline{QV} ?



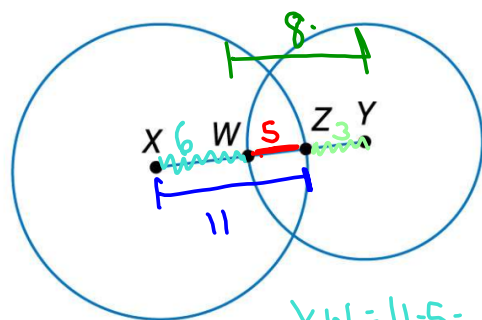
$$\begin{aligned} RT &= 21 \text{ cm} \\ RT &\text{ is diameter} \\ \overline{QV} &\text{ is a radius} \\ r &= \frac{d}{2} \\ QV &= \frac{21}{2} \\ &= 10.5 \text{ cm} \end{aligned}$$

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Example 3

Find Measures in Intersecting Circles

The diameter of $\odot X$ is 22 units, the diameter of $\odot Y$ is 16 units, and $\underline{WZ} = 5$ units. Find XY .



$$XW = 11 - 5 = 6$$

$$\odot X \text{ radius} = \frac{22}{2} = 11$$

$$XZ = 11$$

$$\odot Y \text{ radius} = \frac{16}{2} = 8$$

$$ZY = 8 - 5 = 3$$

$$XY = 6 + 5 + 3 = 14 \text{ units}$$

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Real-World Example 4

Find Circumference

CROP CIRCLES A series of crop circles was discovered in Alberta, Canada, on September 4, 1999. The largest of the three circles had a radius of 30 feet. Find its circumference.

$$\textcircled{4} \quad C = 2\pi r \quad r = 30 \text{ ft}$$

$$C = 2\pi \cdot 30$$

$$C = 60\pi \text{ ft} \quad \text{exact answer}$$

nearest tenth $C \approx 188.5 \text{ ft}$

$$C \approx 188.4 \text{ ft}$$

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Example 5

Find Diameter and Radius

Find the diameter and the radius of a circle to the nearest hundredth if the circumference of the circle is 65.4 feet.

⑤ Given $C = 65.4\text{ft}$ find d and r to nearest hundredth

$$C = \pi d$$

$$\frac{65.4}{\pi} = \frac{\pi d}{\pi}$$

$$\underline{20.82\text{ft}} \approx d$$

$$\underline{20.83\text{ft}} \approx d$$

$$C = 2\pi r$$

$$\frac{65.4}{(2\pi)} = \frac{2\pi r}{2\pi}$$

$$\underline{10.41\text{ft}} \approx r$$

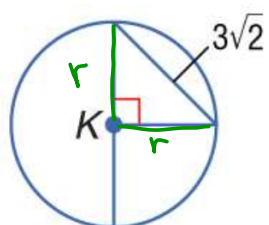
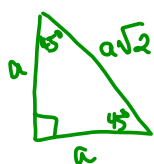
$$\underline{10.41\text{ft}} \approx r$$

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Example 6

Circumference of Circumscribed Polygon

Find the exact circumference of $\odot K$.



$$\frac{a\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{\sqrt{2}}$$

$$a = 3$$

Find exact circumference

$$\text{radius} = 3$$

$$C = 2\pi r$$

$$= 2\pi \cdot 3$$

$$= 6\pi \text{ units} \leftarrow \text{exact answer}$$

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Write 3 Questions for this section on the left page

1. How are you doing?

Write answer next to the Summary

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- 2: I understand a little.
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Summary: At least 3 sentences...

Write this now.