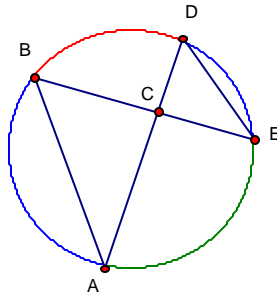


**1. Exploring Segment Lengths**



- Explain why  $\angle B \cong \angle D$  and  $\angle A \cong \angle E$ .
- Explain why  $\triangle ABC$  is similar to  $\triangle EDC$ .
- Complete this proportion:

$$\frac{AC}{EC} = \frac{?}{DC}$$

- Complete this equation:  $AC * DC = \underline{\hspace{2cm}} * EC$

Will the equation in part (a) be true for any pair of chords that intersect inside a circle? Explain.

Open "lengthseg.gsp".

**Figure 1:**

- Find each length:  $AC = \underline{\hspace{1cm}}$   $DC = \underline{\hspace{1cm}}$   $BC = \underline{\hspace{1cm}}$   $EC = \underline{\hspace{1cm}}$
- Calculate:  $AC * DC = \underline{\hspace{2cm}}$   $BC * EC = \underline{\hspace{2cm}}$
- Based on your observations in #2, make a conjecture about chords that intersect inside a circle. \_\_\_\_\_

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**Figure 2:**

- Find each length:  $CA = \underline{\hspace{1cm}}$   $CD = \underline{\hspace{1cm}}$   $CB = \underline{\hspace{1cm}}$   $CE = \underline{\hspace{1cm}}$
- Calculate:  $CA * CD = \underline{\hspace{2cm}}$   $CB * CE = \underline{\hspace{2cm}}$
- Based your observations on #2, make a conjecture about lines (secants) that intersect outside a circle. \_\_\_\_\_

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**Figure 3:**

1. Find each length:  $AC = \underline{\hspace{1cm}}$   $CD = \underline{\hspace{1cm}}$   $BC = \underline{\hspace{1cm}}$
2. Calculate:  $AC * CD = \underline{\hspace{1cm}}$   $BC * BC = \underline{\hspace{1cm}}$
3. Based on your observations in #2, make a conjecture about secant and tangent lines. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Figure 4:**

1. Find each length:  $AC = \underline{\hspace{1cm}}$   $BC = \underline{\hspace{1cm}}$   
Based on your observations in #1, make a conjecture about tangent lines to a circle. \_\_\_\_\_  
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**Real World Application:**

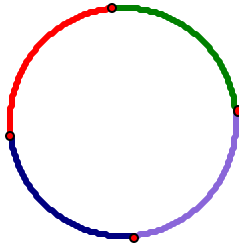
1. Suppose you stop at a small pizza shop for lunch. The shop sells pizza by the slice. Each pizza is cut into eight equal pieces. You can afford two slices from a small pizza with the diameter of 10 inches or one slice from a large pizza with the diameter of 14 inches. Which will satisfy your hunger better?



- a. What is the area of one slice of the large pizza?
  
  
  
  
  
  
  
  
  
  
- b. What is the area of two slices of the small pizza?

Each pizza slice represents a geometric figure called a *sector*. A **sector** is a region of a circle that is bounded by two radii and an arc of the circle. The area of the sector depends on the measure of the arc and the radius of the circle.

2. Suppose you wanted to personalize your car by creating a cushion for your steering wheel. The diameter of your steering wheel is 15.5 inches. You want your steering wheel cushion to have four different themes, so you divide it into four equal parts. How long is each strip?



3. The diameter of Spaceship Earth at Epcot Center in Orlando, Florida is 165 feet. Suppose you are standing at a spot where you can see the upper half of Spaceship Earth. How long is the arc length of the upper semicircle of Spaceship Earth?



<http://www.disneytyme.com/Epcot.html>

4. You and your father are building a stained-glass arch window above your rectangle window. The dimension of the rectangle window is 3 X 5 feet. You and your father decide to build a semicircle arched window with diameter of 3 feet. You have three stained-glass colors- green, red, and blue. If you divide the arched window into three equal parts in a fan-like form, what is the area of each stained-glass window?

