Finding the area of a sector

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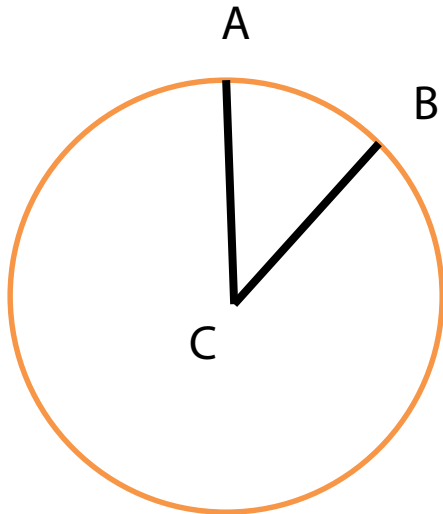
What is a sector?

- A sector is the region of a circle bound by two radii and their intercepted arc. In other words, a sector is a slice of a circle that includes the center.

  - In the picture, the sector ACB is bound by the radii AC and BC. It is also bound by AB

Helpful Hints:
Demonstrate and have students practice writing line segments and sectors across with varying letters and using the symbols (e.g., curved lines or straight lines)

A

B

C

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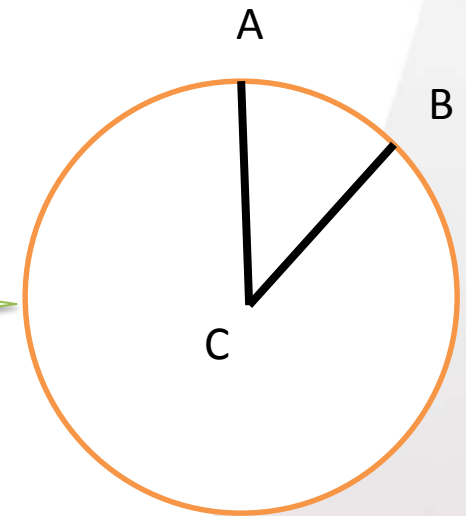
Formula for area of a sector

The degree for $\overset{\frown}{AB}$

Pi which is a constant and equals approximately 3.14

$$A = \frac{m\overset{\frown}{AB}}{360^\circ} \times \pi r^2$$

Total number of degrees in a circle

The length of either $\overline{AC}$ or $\overline{BC}$

A

B

C

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Let's see an example

$$A = \frac{mAB}{360^o} \times \pi r^2$$
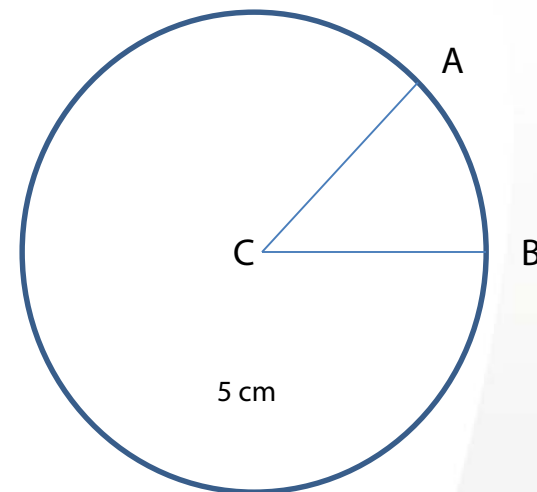
If Sector ACB intercepts an arc whose measure is 80°

Step 1: $A = \frac{80}{360} \times \pi (5)^2$
(plug in all the numbers from the picture)

Helpful Hint: Remember to review order of operations. Students must square r before they multiply by π

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Example cont.

Step 2: A=$\frac{80}{360}$ x π (25)

Square the radius

Simplify the fraction
↓

Step 3: A= .22 x 78.5

Multiplied radius by Pi

Step 4: A≈17.27cm^2

Note the change in symbol to communicate an approximation

Don't forget to label the units

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Ideas for application

- Introduce the idea of a sector of a circle using pizza or pie. Each slice represents a sector

- Construct a manipulative which allows the student to remove a sector of a circle

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Making Connections

- Finding the area of a sector addresses the following High School Core Content Connectors
  - H.NO.2a1 Solve simple equations using rational numbers with one or more variables
  - H.NO.2c1 Simplify expressions that include exponents
  - H.ME.2b4 Apply the formula to the area of a sector
  - H.ME.1a1 Determine the necessary unit(s) to use to solve real world problems

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