CODE RED – DO NOW

Complete #1-3 on a separate sheet of paper

1. Define the following words:

   Radius, Diameter, Circumference, Area

2. Find the circumference of a circle with an area of $49\pi \ in^2$

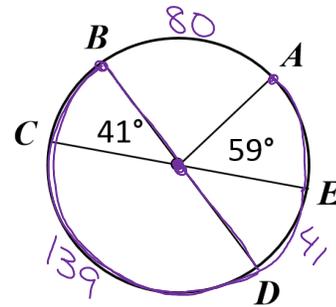 $A = \pi r^2$ $\sqrt{r^2} = \sqrt{49}$ $C = 2\pi r$

   $49\pi = \pi r^2$ $r = 7$ $C = 2\pi 7$

   $C = 14\pi \ in$

3. Use the circle to find the measure of the following arcs:

   a) $m\widehat{CD} = $ ___139°___

   b) $m\widehat{BEA} = $ ___280°___

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Arc Length and Sector Area

SOL G.11

Learning Target: By the end of class today, given the radius and a central angle within a circle, I will be able to find the corresponding arc length and sector area and will do this by taking notes and doing practice problems as a class before scoring at least 75% on an exit ticket, answering at least 3 out of 4 questions correctly.

Essential Questions:
- How can line segments form angles both inside and outside of circles?
- How can intercepted arcs be used to show a relationship among angles, line segments and lines?

Today's Agenda

✓DO NOW

✓Parts of a Circle

✓Area and Circumference

✓Central Angles and Arc Measures

✓Arc Length and Sector Area

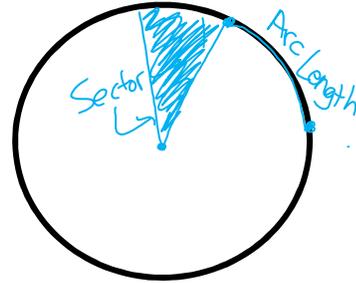✓Exit Ticket
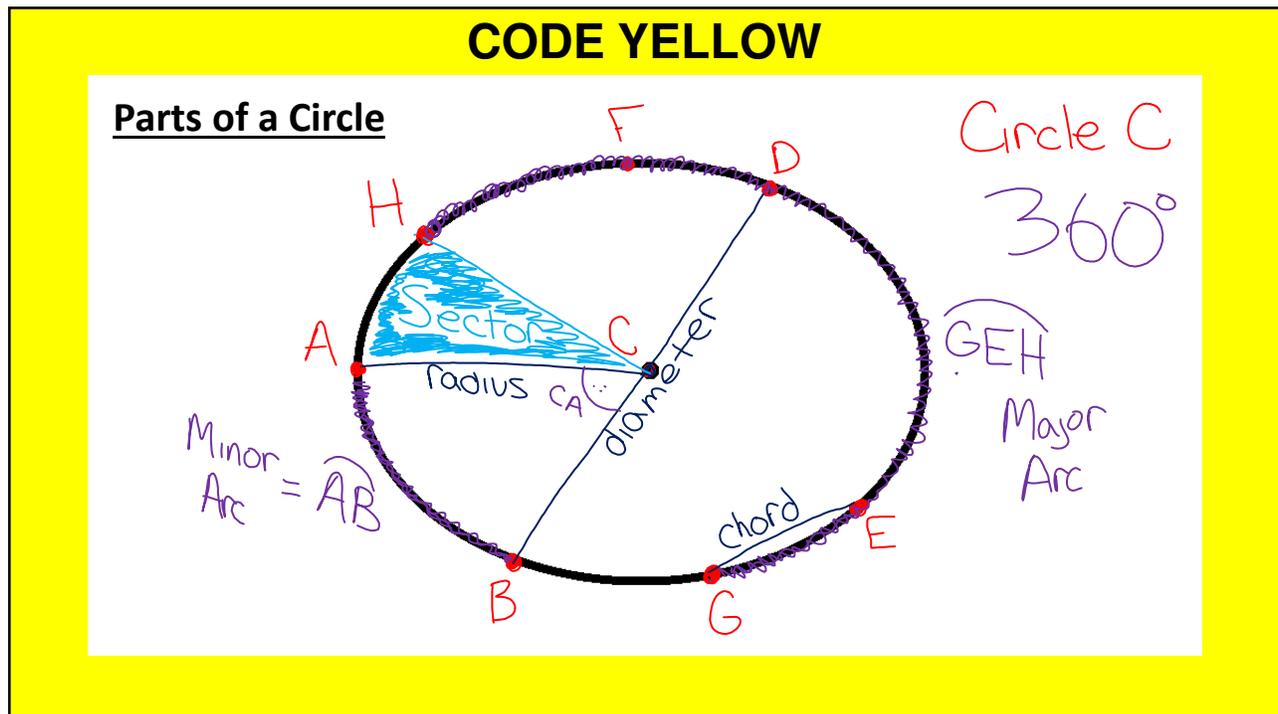
CODE YELLOW

CODE YELLOW

Vocabulary

Arc Length – the length of an arc around a circle; part of the circumference

Sector – a piece of the area

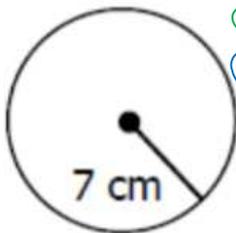Sector Area – the area of part of a circle
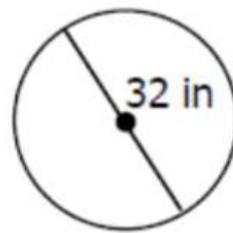
CODE YELLOW

Circumference Formula

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

$C = 2\pi r$
$C = 2\pi 7$
$C = 14\pi \text{ cm}$
$A = \pi r^2$
$A = \pi 7^2$
$A = 49\pi \text{ cm}^2$

7 cm

Area Formula

$(A = \pi r^2)$

$C = \pi d$
$C = 32\pi \text{ in}$
$A = \pi r^2$
$A = \pi 16^2$
$A = 256\pi \text{ in}^2$

32 in

CODE YELLOW

Find the measure of the following arcs:
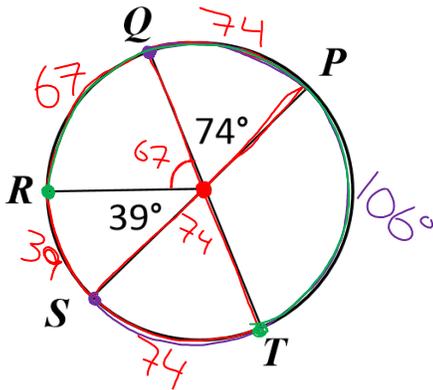
a) $m\widehat{QR} = $ __67°__

b) $m\widehat{TS} = $ __74°__

c) $m\widehat{QPS} = $ __254°__

d) $m\widehat{TQR} = $ __247°__

CODE YELLOW

Yoemi and Nancy are out for a run around Menchville Park. The park is 7 kilometers in *circumference*. If they run half of the way around the park, how far did they run?
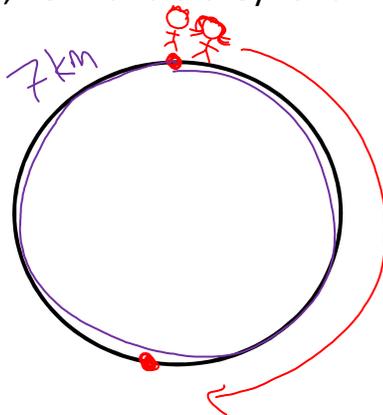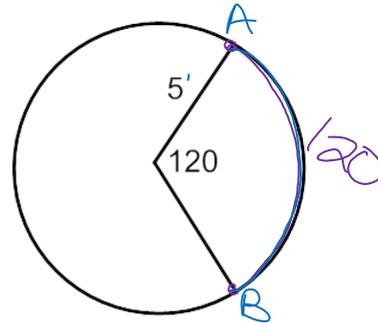

$$\frac{7}{2} = \boxed{3.5 \text{ km}}$$

CODE YELLOW

Arc Length

- An *arc* is part of the circumference

- To find the length of an arc, use the following proportion:

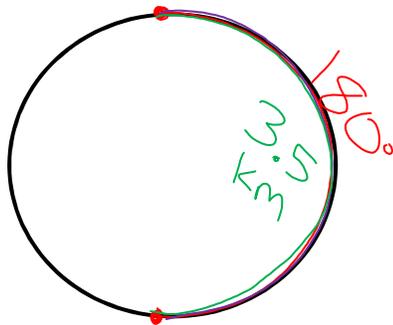$$\frac{arc\ measure}{360} = \frac{arc\ length}{Circumference}$$

P   P
W   W

5'

120   120
A
B

$$\frac{120}{360} \times \frac{x}{10\pi}$$

$$\frac{360x}{360} = \frac{120 \times 10\pi}{360}$$

$$\boxed{x = 10.5 \text{ ft}}$$

CODE YELLOW

Yoemi and Nancy are out for a run around Menchville Park. The park is 7 kilometers in *circumference*. If they run half of the way around the park, how far did they run?

3.5 km   180°

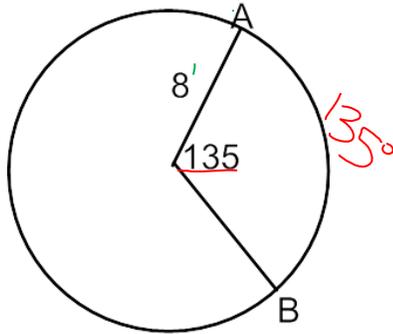$$\frac{arc\ measure}{360} = \frac{arc\ length}{Circumference}$$

$$\frac{180}{360} \times \frac{x}{7}$$

$$\frac{360x}{360} = \frac{180 \times 7}{360}$$

$$\boxed{x = 3.5 \text{ km}}$$

CODE YELLOW

Find the arc length of $\widehat{AB}$

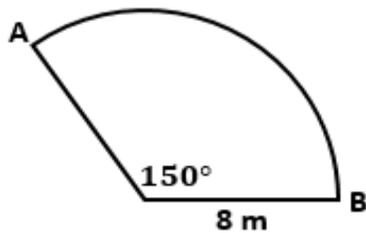$$\frac{arc\ measure}{360} = \frac{arc\ length}{Circumference}$$

$$\frac{135}{360} = \frac{x}{16\pi}$$

$$\frac{360x}{360} = \frac{135 \times 16\pi}{360}$$

$$\boxed{x = 19\ ft}$$

CODE GREEN

Find the arc length of $\widehat{AB}$

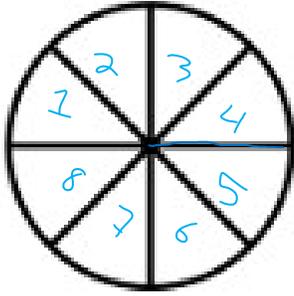$$\frac{arc\ measure}{360} = \frac{arc\ length}{Circumference}$$

$$\frac{150}{360} = \frac{x}{16\pi}$$

$$\frac{360x}{360} = \frac{150 \times 16\pi}{360}$$

$$\boxed{x = 21\ m}$$

CODE YELLOW

Kevin and Haneen ordered a 12-inch *(in diameter)* pizza from Domino's. Together, they ate *2* out of the *8* slices. What was the _area_ of the pizza that they ate?

$$A = \pi r^2$$
$$A = \pi 6^2$$
$$A = 36\pi = \boxed{113.1}$$

$$\frac{113.1}{8} = 14.1 \times 2 = \boxed{28.2 \text{ in}^2}$$
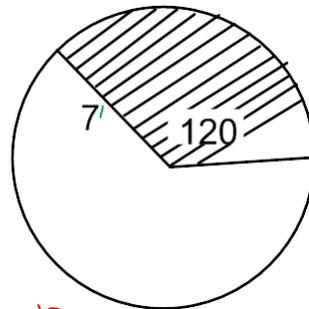$$\downarrow$$
1 slice

CODE YELLOW

Sector Area

- A **_sector_** is part of the area
- To find the area of a sector, use the following proportion:

$$\frac{arc\ measure}{360} = \frac{sector\ area}{Area\ of\ Circle}$$

$$\frac{120}{360} \times \frac{x}{49\pi}$$
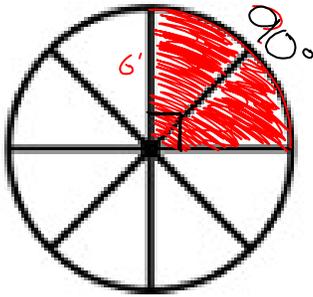
$$\frac{360x}{360} = \frac{120 \times 49\pi}{360}$$

$$\boxed{x = 51.3\ ft^2}$$

7' 120

CODE YELLOW

Kevin and Haneen ordered a 12-inch (*in diameter*) pizza from Domino's. Together, they ate *2* out of the *8* slices. What was the *area* of the pizza that they ate?

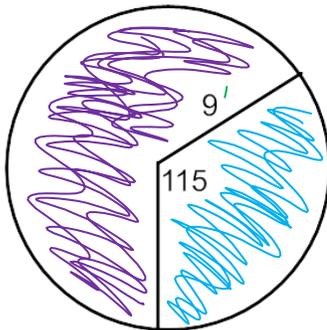$$\frac{arc\ measure}{360} = \frac{sector\ area}{Area\ of\ Circle}$$

$$\frac{90}{360} \times \frac{X}{36\pi}$$

$$\frac{360x}{360} = \frac{90 \times 36\pi}{360}$$

$$X = 28.27\ in^2$$

CODE YELLOW

Find the area of the smaller sector.

$$\frac{arc\ measure}{360} = \frac{sector\ area}{Area\ of\ Circle}$$
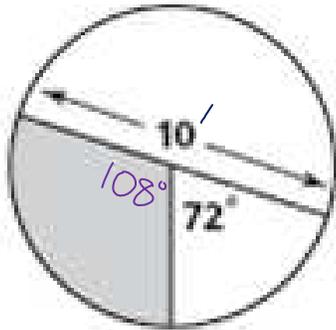
$$\frac{115}{360} \times \frac{X}{81\pi}$$

$$\frac{360x}{360} = \frac{115 \times 81\pi}{360}$$

$$X = 81.3\ ft^2$$

BONUS: What is the area of the larger sector $81\pi - 81.3 = 173.2\ ft^2$

CODE GREEN

Find the area of the shaded region.

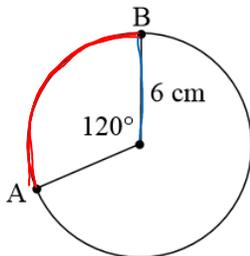$$\frac{arc\ measure}{360} = \frac{sector\ area}{Area\ of\ Circle}$$

$$\frac{108}{360} \times \frac{X}{25\pi}$$

$$\frac{360x}{360} = \frac{108 \times 25\pi}{360}$$

$$X = 23.6\ ft^2$$

CODE GREEN

1. Find the <u>length</u> of arc AB.

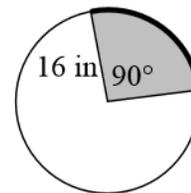$$\frac{arc\ measure}{360} = \frac{arc\ length}{Circumference}$$

$$\frac{120}{360} \times \frac{X}{12\pi}$$

$$\frac{360x}{360} = \frac{120 \times 12\pi}{360}$$

$$X = 12.6\ cm$$

Calculate the sector area:

a.

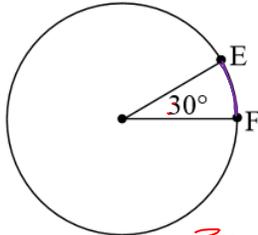$$\frac{arc\ measure}{360} = \frac{sector\ area}{area}$$

$$\frac{90}{360} \times \frac{X}{256\pi}$$

$$\frac{360x}{360} = \frac{90 \times 256\pi}{360}$$

$$X = 201\ in^2$$

9

CODE GREEN

3. The length of arc $\widehat{EF}$ is 5π in. Find the length of the radius.

E
30°
F

Radius: _____ 30 in _____

$$\frac{\text{arc measure}}{360} = \frac{\text{arc length}}{\text{circumference}}$$

$$\frac{30}{360} = \frac{5\pi}{2\pi r}$$

$$30 \cdot 2r = 360 \times 5$$

$$\frac{60r}{60} = \frac{1800}{60}$$

$$r = 30 \text{ in}$$

CODE GREEN

12. Find the radius of a circle which has a sector area of 9π whose central angle is 90°.

$$r = ?$$

$$SA = 9\pi$$

$$CA = 90^{o}$$

$$\frac{\text{arc measure}}{360} = \frac{\text{Sector area}}{\text{area}}$$

$$\frac{90}{360} = \frac{9\pi}{\pi r^2}$$
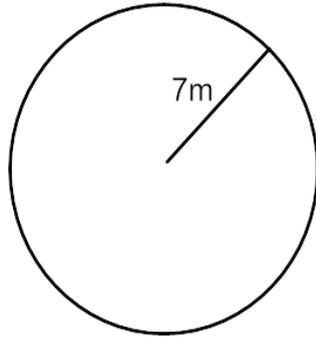
$$360 \times 9 = 90 r^2$$

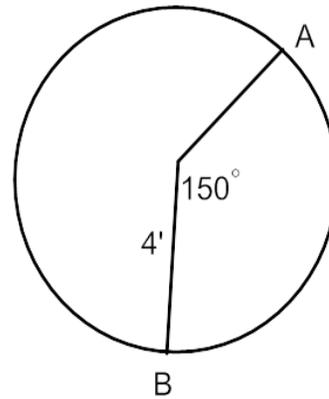$$\frac{3240}{90} = \frac{90 r^2}{90}$$

$$\sqrt{r^2} = \sqrt{36}$$

$$r = 6$$

CODE RED – EXIT TICKET

1. Find the circumference and area for the circle shown.

7m

2. Find the arc length and sector area for AB

A

150°

4'

B

CODE RED – EXIT TICKET

Answers:

1) 12.6 cm
2) 12.6 cm
3) 30 in
4) 12.2 cm
5) 396
6) 19.6
7) 140

8) a. 201 in^2
   b. 75.4 m^2
   c. 113.1 m^2
9) 88.4 in^2
10) 75.4 in^2
11) 150.8 in^2
12) 6
13) 5
14) 50