

10.9

Wednesday, March 1, 2017 10:09 AM

A series of horizontal blue lines for writing, with a vertical red margin line on the left side.

Example 1: Given the circumference of a circle is 18π , find the length of:

a) 35° arc

$$\frac{35}{360} \cdot 18\pi = \frac{7\pi}{4}$$

b) 120° arc

$$\frac{1}{3} \cdot 18\pi = 6\pi$$

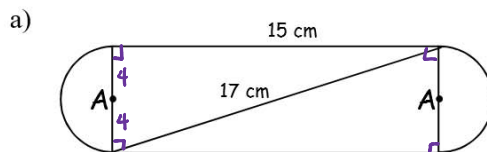
Example 2: If the arc length of a circle with radius 10 is 5π , find the circumference, area of the circle and measure of the arc.

$$C = 20\pi$$

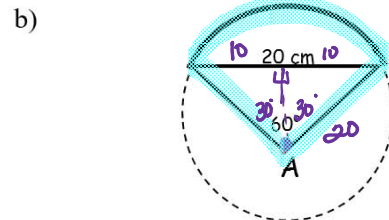
$$A = 100\pi$$

$$\text{arc measure} = \frac{5\pi}{20\pi} \cdot 360^\circ = \frac{1}{4} \cdot 360^\circ = 90^\circ$$

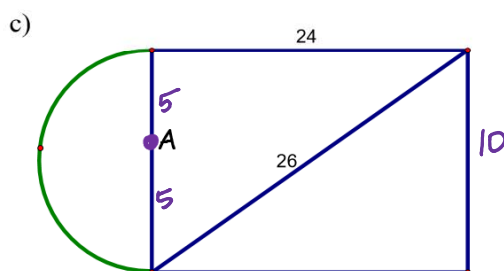
Example 3: Find the exact perimeter of the following figures that are made from parts of circle A.



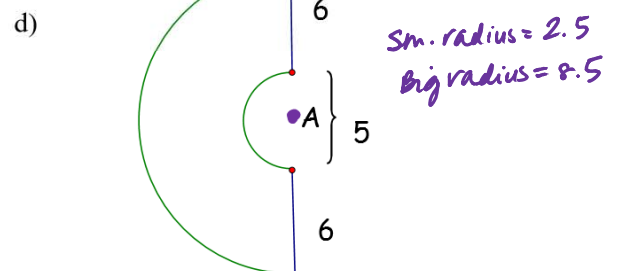
$$\text{perimeter} = 8\pi + 30$$



$$\begin{aligned} \text{perimeter} &= 40 + \frac{60}{360} \cdot 40\pi \\ &= 40 + \frac{20\pi}{3} \end{aligned}$$



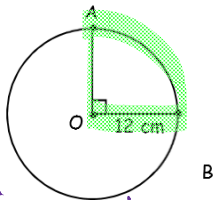
$$\begin{aligned} \text{perimeter} &= 58 + \frac{1}{2} \cdot 10\pi \\ &= 58 + 5\pi \end{aligned}$$



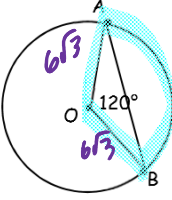
$$\begin{aligned} \text{perimeter} &= 12 + \frac{1}{2} \cdot 17\pi + \frac{1}{2} \cdot 5\pi \\ &= 12 + 11\pi \end{aligned}$$

Sm. radius = 2.5
Big radius = 8.5

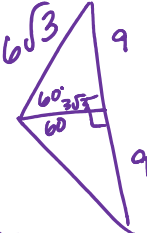
Example 4: Find the exact perimeter of each "sector," aka pie piece.

a) 

perimeter = $24 + \frac{1}{4} \cdot 24\pi$
 $= 24 + 6\pi$

b) 

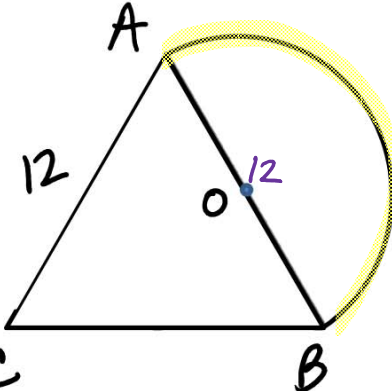
perimeter = $12\sqrt{3} + \frac{1}{3} (12\sqrt{3}\pi)$
 $= 12\sqrt{3} + 4\sqrt{3}\pi$



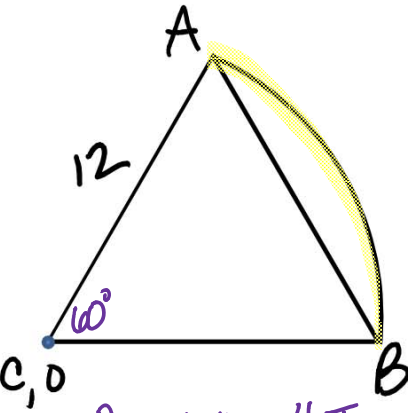
AB = 18 cm

$x\sqrt{3} = 9$
 $x = \frac{9 \cdot \sqrt{3}}{\sqrt{3}} = \frac{9\sqrt{3}}{3} = 3\sqrt{3}$

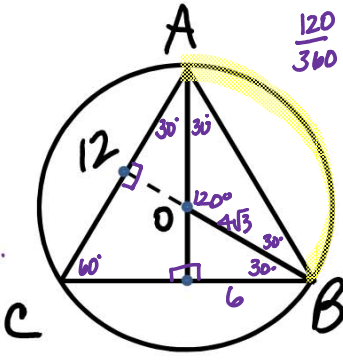
Example 5: Find the arc length of AB. Triangle ABC is equilateral and O is the center of the circle.
 (Note: none of the diagrams are drawn to scale)



arc length = $\frac{1}{2} \cdot 12\pi$
 $= 6\pi$

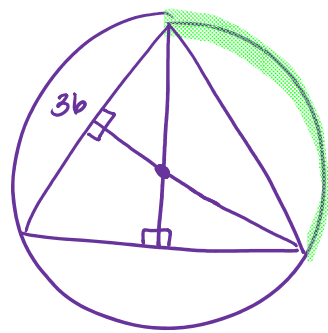


$\frac{60}{360} \cdot 24\pi = 4\pi$

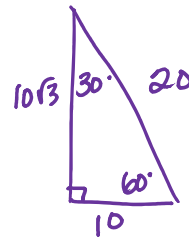
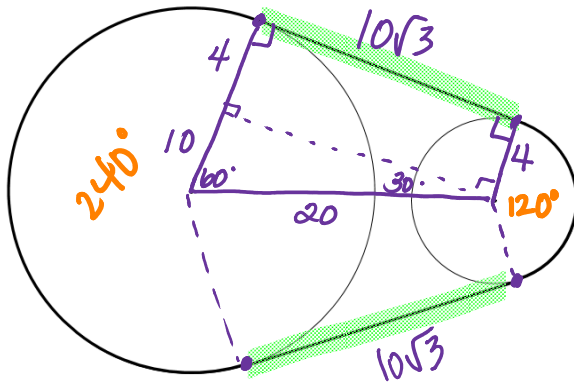


$\frac{120}{360} \cdot 8\sqrt{3}\pi = \frac{8\sqrt{3}\pi}{3}$

$x\sqrt{3} = 6$
 $x = \frac{6 \cdot \sqrt{3}}{\sqrt{3}} = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$



Example 6: Two pulleys are connected by a belt. The pulleys have radii of 14cm and 4cm. The distance between their centers is 20 cm. Find the total length of the belt needed to go around these two pulleys.



$$\begin{aligned} & \frac{240}{360} \cdot 28\pi + \frac{120}{360} \cdot 8\pi + 20\sqrt{3} \\ &= \frac{2}{3} \cdot 28\pi + \frac{1}{3} \cdot 8\pi + 20\sqrt{3} \\ &= \frac{64\pi}{3} + 20\sqrt{3} \end{aligned}$$