

Before we begin, are there any questions from last day's work?

Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) solve problems involving properties of circles.

Project Renovation assignment past due.

Cake Decorating assignment past due.

6.10.3 Bicycle Race

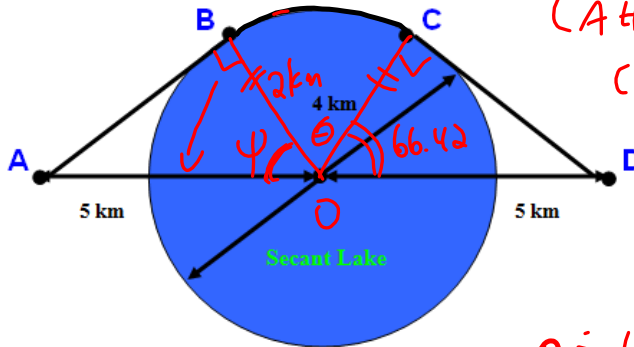
You have decided to take part in this year's *Secant Lake* bicycle race. The race is run every year to raise money to preserve the wildlife in the area. You are able to raise \$10 for every kilometre travelled on your bike and you hope to travel the course 3 times.



Secant Lake is a circular lake that has a diameter of 4 km, as shown in the diagram below. Points *A* and *D* are the opposite sides of *Secant Lake* and lie on a straight line through the centre of the lake, with each point 5 km from the centre. The course of the race is *ABCD*, where *AB* and *CD* are tangents to the lake and *BC* is an arc along the shore of the *Secant Lake*. Using your knowledge of circle geometry and trigonometry determine:

- a) the length of the route and
- b) the amount of money you can raise

a) 10.812 km
b) \$324.36



$$\begin{aligned} \text{a) } AB + \widehat{BC} + CD \\ \doteq 4.583(2) + 1.646 \\ \doteq 10.812 \text{ km} \end{aligned}$$

$$\begin{aligned} AB^2 &= 5^2 - 2^2 \\ &= 25 - 4 \\ AB &= \sqrt{21} \\ &\doteq 4.5825 \\ &\doteq 4.583 \\ &\doteq CD \end{aligned}$$

$$\begin{aligned} \text{CAH} \\ \cos \phi &= \frac{2}{5} \\ \phi &= \cos^{-1}\left(\frac{2}{5}\right) \\ &\doteq 66.42 \\ \theta &= 180^\circ - 2(66.42) \\ &= 47.16^\circ \end{aligned}$$

$$\begin{aligned} \widehat{BC} &= \frac{\theta}{360} (2\pi(2)) \\ &= \frac{47.16}{360} (4\pi) \\ &\doteq 1.6461 \\ &\doteq 1.646 \end{aligned}$$

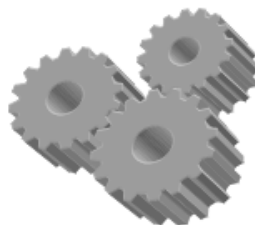
$$\text{b) } 3 \text{ times course } 10.812$$

$$\doteq 32.436$$

$$\begin{aligned} \therefore \text{Money Raised} &= \$10 \times 32.436 \\ &= \$324.36 \end{aligned}$$

6.10.4 Investigating Circle Geometry

Complete the following problems using the concepts and strategies discussed in class.



1. Find the arc length to the nearest centimetre, of the sector of a circle with radius;
- a) 7 m, if the sector angle is 120° b) 90 cm, if the sector angle is 225°

2. If an arc length of 14.2 cm has a sector angle of 74° , determine the radius (to 1 decimal place).

$$a = \left(\frac{\theta}{360}\right) 2\pi r$$

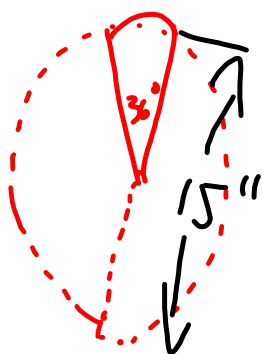
$$14.2 = \frac{74}{360} 2\pi r$$

$$\frac{14.2}{\left(\frac{74}{360} \cdot 2\pi\right)} = r$$

3. Two sectors of a circle have sector angles of 35° and 105° respectively.
The arc length of the smaller sector is 17 cm. Determine the arc length of the larger sector.

4. Determine the entire area of a circle given that a 60° sector of the circle has an area of 19 m^2 .

5. You are working at a pizza delivery store and your math teacher places a special order: a large (15 inches in diameter) pizza with pepperoni on just a 36-degree slice of the pizza. Determine the area of the pizza that will have pepperoni on it.



$$\therefore \text{radius} = 7.5''$$

$$\begin{aligned} \text{Sector Area} &= \frac{36}{360} \pi r^2 \\ &= \frac{1}{10} \pi (7.5)^2 \\ &= \end{aligned}$$

6. The sector angle in a given circle is 40° , and the area of the sector is 20 cm^2 . Determine the arc length of the sector (to 2 decimal places).