



Math Virtual Learning

# Geometry/Honors Geometry

Tuesday, May 12, 2020



# Geometry/Honors Geometry

## Lesson: May 12, 2020

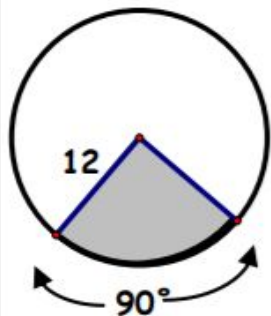
**Objective/Learning Target:**  
Students will find the length of an arc.

# Warm-Up:

Find the shaded area. On problems 1-3, find the arc length for the shaded sector also.

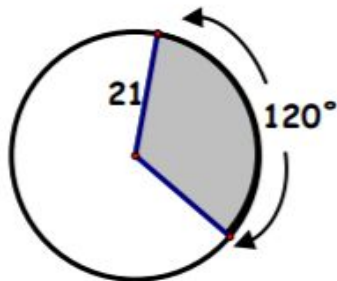
1.  $A_{\text{sector}} =$  \_\_\_\_\_

Arc length = \_\_\_\_\_



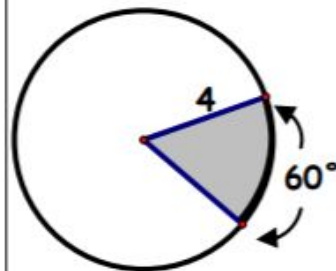
2.  $A_{\text{sector}} =$  \_\_\_\_\_

Arc length = \_\_\_\_\_



3.  $A_{\text{sector}} =$  \_\_\_\_\_

Arc length = \_\_\_\_\_



# Warm-Up

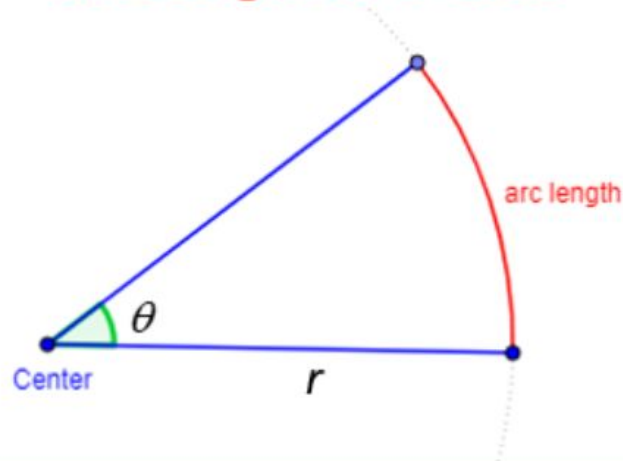
Answers:

1. Area =  $36\pi u^2$  and arc length =  $6\pi u$

2. Area =  $147\pi u^2$  and arc length =  $14\pi u$

3. Area =  $8\pi/3 u^2$  and arc length =  $4\pi/3 u$

## Arc Length of a Circle



If  $\theta$  is measured in degrees then

$$\text{arc length} = \frac{\theta}{360^\circ} \times 2\pi r$$

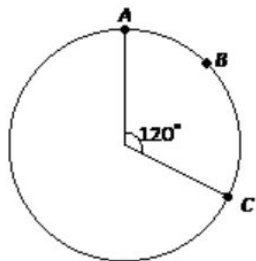
If  $\theta$  is measured in radians then

$$\text{arc length} = \theta r$$

## Calculate Arc Length given Measure of Arc in degrees

From the formula, we can calculate the length of the arc.

*Example:*



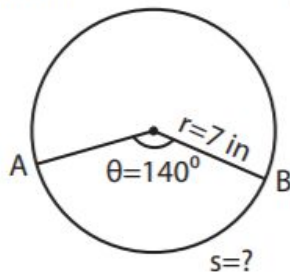
If the circumference of the following circle is 54 cm, what is the length of the arc  $ABC$ ?

*Solution:*

$$\text{Circumference} = 2\pi r = 54$$

$$\begin{aligned}\text{Arc Length} &= 2\pi r \times \frac{m}{360^\circ} \\ &= 54 \times \frac{120^\circ}{360^\circ} \\ &= 18\text{cm}\end{aligned}$$

Example:

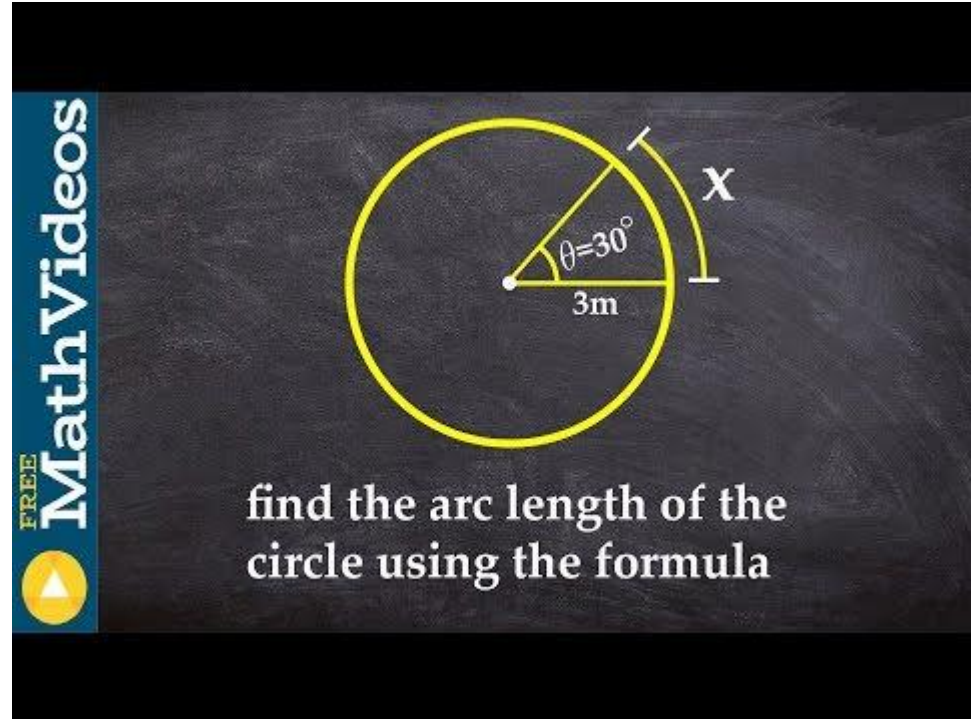


$$\begin{aligned}\text{Arc length of a sector (s)} &= \frac{\text{central angle}}{180^\circ} \times \pi \times \text{radius} = \frac{\theta \times \pi \times r}{180^\circ} \\ &= \frac{140^\circ \times 3.14 \times 7}{180^\circ}\end{aligned}$$

Length of the arc AB = **17.10 in**

# Information

Please watch the following  
examples: First Video:  
Examples of finding the  
Measure of an arc length



# Practice:

## Question 1 :

Find the length of arc whose radius is 42 cm and central angle is  $60^\circ$ .

## Question 2 :

Find the length of arc whose radius is 10.5 cm and central angle is  $36^\circ$ .

## Question 3 :

Find the length of arc whose radius is 21 cm and central angle is  $120^\circ$ .

## Question 4 :

Find the length of an arc, if the radius of circle is 14 cm and area of the sector is 63 square cm.



# Answers

## Question 1 :

Find the length of arc whose radius is 42 cm and central angle is  $60^\circ$ .

### Answer :

Arc length is

$$= (\theta/360^\circ) \cdot 2\pi r$$

Substitute  $r = 42$  and  $\theta = 60^\circ$ .

$$= (60^\circ/360^\circ) \cdot 2 \cdot (22/7) \cdot 42$$

$$= (1/4) \cdot 2 \cdot 22 \cdot 6$$

$$= 66$$

So, the length of the arc is 11 cm.

## Question 2 :

Find the length of arc whose radius is 10.5 cm and central angle is  $36^\circ$ .

### Answer :

Arc length is

$$= (\theta/360^\circ) \cdot 2\pi r$$

Substitute  $r = 10.5$  and  $\theta = 36^\circ$ .

$$= (36^\circ/360^\circ) \cdot 2 \cdot (22/7) \cdot 10.5$$

$$= (1/10) \cdot 2 \cdot 22 \cdot 1.5$$

$$= 6.6$$

So, the length of the arc is 6.6 cm.

# Answers continued

## Question 3 :

Find the length of arc whose radius is 21 cm and central angle is  $120^\circ$ .

### Answer :

Arc length is

$$= (\theta/360^\circ) \cdot 2\pi r$$

Substitute  $r = 21$  and  $\theta = 120^\circ$ .

$$= (120^\circ/360^\circ) \cdot 2 \cdot (22/7) \cdot 21$$

$$= (1/3) \cdot 2 \cdot 22 \cdot 3$$

$$= 44$$

So, the length of the arc is 44 cm.

## Question 4 :

Find the length of an arc, if the radius of circle is 14 cm and area of the sector is 63 square cm.

### Answer :

$$\text{Area of the sector} = 63 \text{ square cm}$$

$$lr/2 = 63$$

Substitute  $r = 14$  cm.

$$l(14)/2 = 63$$

$$l(7) = 63$$

$$l = 9 \text{ cm}$$

So, the required arc length is 9 cm.

# Additional Practice

[Khan Academy Practice](#)

Click on the link and practice 10 problems.

Look at the explanation if you make a mistake: [IXL Length of an arc](#)