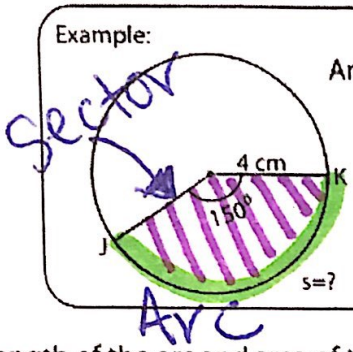
6.1 : Arc Length & Area of Sectors

Name: _____

Math 3

Example:



s=? Area=?

Arc length of a sector (s) = $\frac{\theta \times \pi \times r}{180^0}$

$= \frac{150^0 \times 3.14 \times 4}{180^0}$

= 10.47 cm

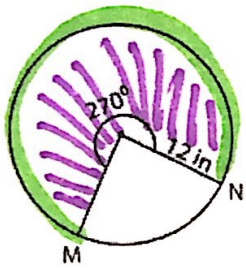
Area = $\boxed{\frac{\theta \pi r^2}{360}}$

$= \frac{150 \cdot 3.14 \cdot 4^2}{360}$

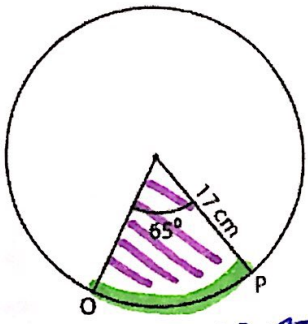
= 20.94 cm²

Find the length of the arc and area of the shaded region. Round the answer to two decimal places. (use π = 3.14)

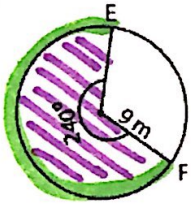
1)



2)



3)



Length of the arc MN = 56.52 in

Area of a sector = 339.12 in²

Length of the arc OP = 19.27 cm

Area of a sector = 163.84 cm²

Length of the arc EF = 37.68 m

Area of a sector = 169.56 m²

1) Length of arc MN = 56.52 in

$$\frac{\theta \pi r}{180^\circ} = \frac{270(3.14)(12)}{180}$$

Area of Sector = 339.12 in^2

$$\frac{\theta \pi r^2}{360} = \frac{270(3.14)(12)^2}{360}$$

2) Length of arc OP = 19.27 cm

$$\frac{\theta \pi r}{180^\circ} = \frac{65(3.14)(17)}{180}$$

Area of Sector = 163.84 cm^2

$$\frac{\theta \pi r^2}{360} = \frac{65(3.14)(17)^2}{360}$$

3) Length of arc EF = 37.68 m

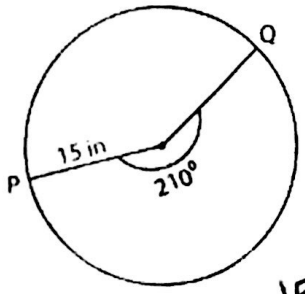
$$\frac{\theta \pi r}{180} = \frac{240(3.14)(9)}{180}$$

Area of Sector = 169.56 m^2

$$\frac{\theta \pi r^2}{360} = \frac{240(3.14)(9)^2}{360}$$

Find the missing one. Round the radius and central angle to the nearest whole number.
Round the arc length to two decimal places. (use $\pi = 3.14$)

1)

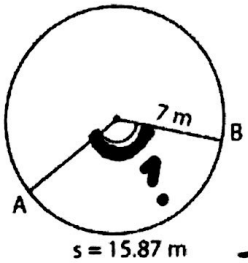


Radius = 15in

Central angle = 210°

Length of the arc PQ = 54.95in

2)



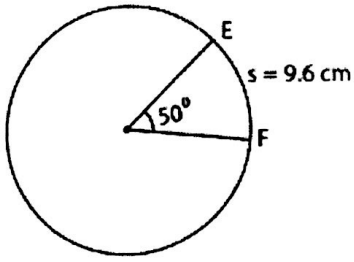
s = 15.87 m

Radius = 7m

Central angle = 130°

Length of the arc AB = 15.87m

3)



Radius = 11 cm

Central angle = 50°

Length of the arc EF = 9.6cm

#1 Length of arc PQ = 54.95 in

$$\frac{\theta \pi r}{180} = \frac{210^\circ (3.14)(15)}{180}$$

#2 Central Angle of $\overset{\frown}{AB}$ = 129.96°

$$s = \frac{\theta \pi r}{180} \qquad 15.87 = \frac{\theta (3.14)(7)}{180}$$

$$180(15.87) = \theta (3.14)(7)$$

$$\frac{2856.6}{(3.14)(7)} = \frac{\theta (3.14)(7)}{(3.14)(7)}$$

#3 Radius of EF = 11 cm

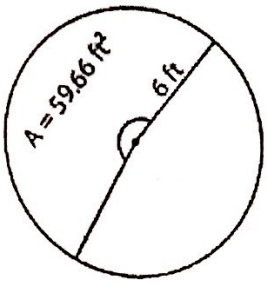
$$s = \frac{\theta \pi r}{180} \qquad 9.6 = \frac{50(3.14)r}{180}$$

$$9.6(180) = 50(3.14)r$$

$$\frac{1728}{50(3.14)} = \frac{50(3.14)r}{50(3.14)}$$

places. (use $\pi = 3.14$)

1)

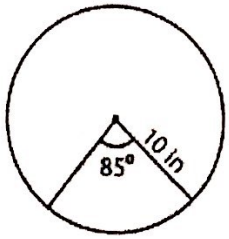


Radius = 6 ft

Central angle = 190°

Area of a sector = 59.66 ft²

2)

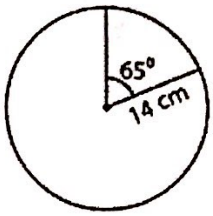


Radius = 10 in

Central angle = 85°

Area of a sector = 74.14 in²

3)



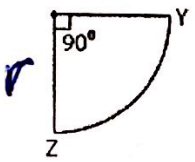
Radius = _____

Central angle = _____

Area of a sector = _____

Find the arc length for each sector. Round the answer to two decimal places. (use π=3.14)

1)



Area = 153.86 cm²

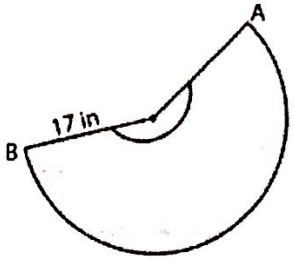
Length of the arc YZ = 21.98 cm

Need radius and central angle

radius = 14 cm

central ∠ = 90°

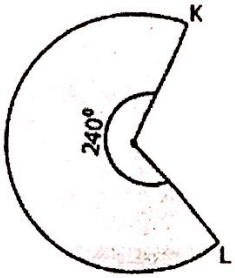
2)



Area = 529.35 in²

Length of the arc AB = _____

3)



Area = 52.33 m²

Length of the arc KL = _____

#1 Central angle = 190°

$$A = \frac{\theta \pi r^2}{360} \qquad 59.66 = \frac{\theta (3.14)(6)^2}{360}$$

$$360(59.66) = \theta (3.14)(6)^2$$

$$\frac{21477.6}{(3.14)6^2} = \frac{\theta (3.14)(6)^2}{(3.14)6^2}$$

#2 Area of sector = 74.14 in²

$$A = \frac{\theta \pi r^2}{360} \qquad A = \frac{85(3.14)(10)^2}{360}$$

#1 Length arc YZ = 21.98 cm

* We first have to solve for the radius

$$A = \frac{\theta \pi r^2}{360} \qquad 153.86 = \frac{90(3.14)r^2}{360}$$

$$360(153.86) = 90(3.14)r^2$$

$$\frac{55389.6}{90(3.14)} = \frac{90(3.14)r^2}{90(3.14)}$$

$$\sqrt{196} = \sqrt{r^2}$$

$$r = 14 \text{ cm}$$

✓ Now, we're ready for arc length

$$S = \frac{\theta \pi r}{180} \qquad S = \frac{90(3.14)(14)}{180}$$

arc YZ = $\boxed{21.98 \text{ cm}}$