

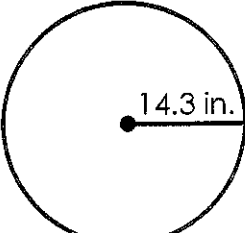
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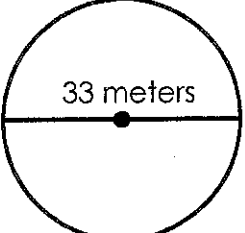
Circles: Arc Length & Area of a Sector

Circumference of a Circle

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

Find the circumference of each circle:

1.  $C = 2(14.3)\pi$
 $C = 89.8 \text{ in}$

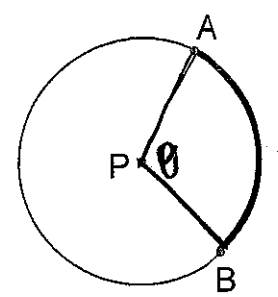
2.  $C = 33\pi$
 $C = 103.7 \text{ m}$

Arc Length of a Circle

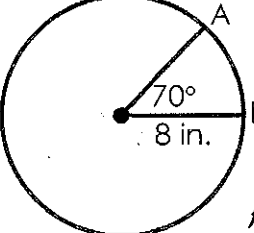
$$\text{Arc Length} = \frac{2\pi r \theta}{360}$$

* Portion of circumference $2\pi r \cdot \frac{\theta}{360}$

$\theta = \text{central angle}$



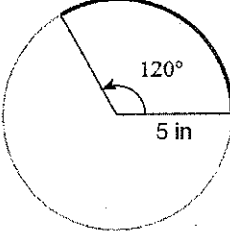
3. Find the arc length of \widehat{AB} :



$$AL = \frac{2\pi(8)(70)}{360}$$

$$AL = \frac{560\pi}{9} = \frac{28\pi}{9} \text{ or } 9.8 \text{ in}$$

4. Find the radius of $\odot P$:



$$AL = \frac{2\pi(r)(120)}{360}$$

$$AL = \frac{10\pi}{3} \text{ in}$$

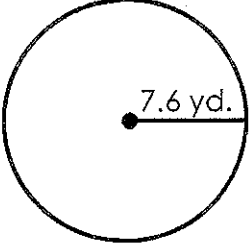
OR

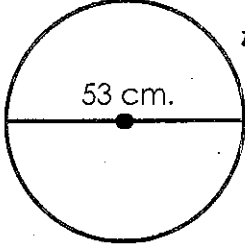
$$AL = 10.5 \text{ in}$$

Area of a Circle.

$$A = \pi r^2$$

Find the area of each circle:

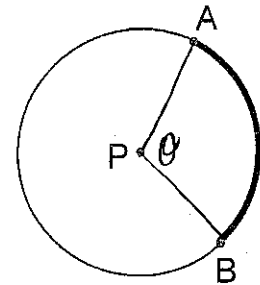
5.  $A = \pi r^2$
 $A = (7.6)^2 \pi$
 $A = 181.46 \text{ yd}^2$

6.  $A = \pi r^2$
 $A = \pi \left(\frac{53}{2}\right)^2$
 $A = \frac{2809\pi}{4} \text{ cm}^2$

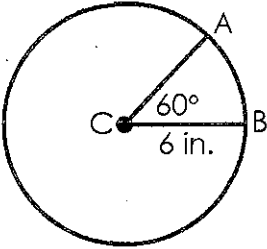
Area of a Sector of a Circle

$$\text{Area Sector} = \frac{\pi r^2 \theta}{360^\circ}$$

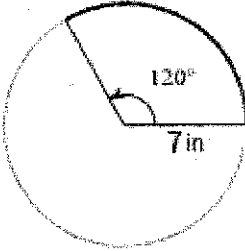
Portion of Area $\pi r^2 \cdot \frac{\theta}{360}$



7. Find the area of the sector formed by $\angle ACB$.

 $A = \frac{36\pi(60)}{360}$
 $A = 6\pi \text{ in}^2$
 OR
 $A = 18.8 \text{ in}^2$

8. Find the area of the sector.

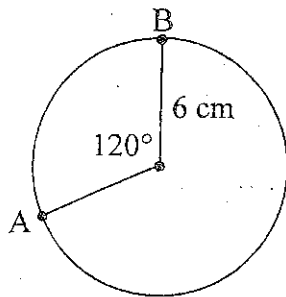
 $A = \frac{49\pi(120)}{360}$
 $A = \frac{49\pi}{3} \text{ in}^2$
 OR
 $A = 51.3 \text{ in}^2$

$$AL = \frac{2\pi r \theta}{360} \quad r = \frac{\pi r^2 \theta}{360}$$

H. Geo: Arc length and Sector Area (WKST 9.2)

Name: _____

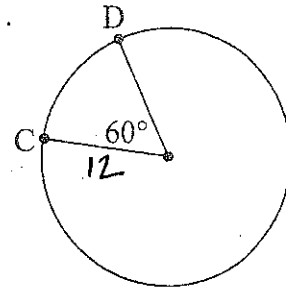
1. Find the length of arc AB .



$$AL = \frac{2\pi(6)(120)}{360}$$

Arc: 4π cm

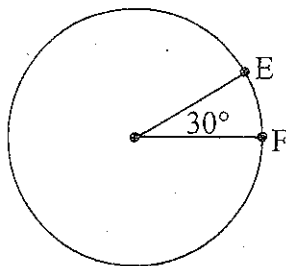
2. The diameter is 24 cm. Find the length of arc CD .



$$AL = \frac{2\pi(12)(60)}{360}$$

Arc: 4π cm

3. The length of arc EF is 5π in. Find the length of the radius.



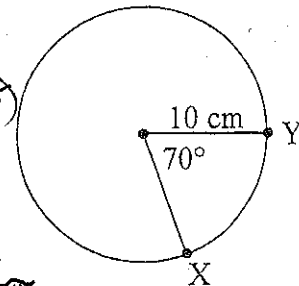
$$5\pi = \frac{2\pi r(30)}{360}$$

$$\frac{30\pi}{\pi} = \frac{\pi r}{\pi}$$

$$30 = r$$

Radius: 30

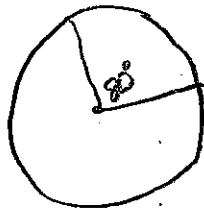
4. Find the length of arc XY .



$$AL = \frac{2\pi(10)(70)}{360}$$

Arc: $\frac{35\pi}{9}$

5. A circle has an arc whose measure is 80° and whose length is 88π . What is the diameter of the circle?



$$L = 88\pi$$

$$88\pi = \frac{2\pi r(80)}{360}$$

$$\frac{72\pi}{4\pi} = \frac{4\pi r}{4\pi}$$

$$r = 18, \quad d = 36$$

6. A circle has a circumference whose length is 25π . Find the length of an arc whose central angle is 90° .

$$C = 25\pi$$

$$d = \frac{25}{2}$$

$$A = \frac{2\pi \left(\frac{25}{2}\right) (90)}{360}$$

$$= \frac{25\pi(90)}{360} = \boxed{\frac{25\pi}{4}}$$

7. Find the measure of the central angle of an arc if its length is 14π and the radius is 18.

$$14\pi = \frac{2\pi(18)\theta}{360}$$

$$14\pi = \frac{36\pi\theta}{360}$$

$$\boxed{\theta = 140^\circ}$$

8. Calculate the sector area:

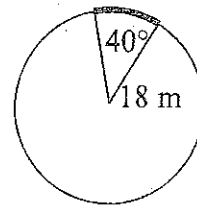
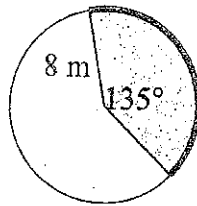
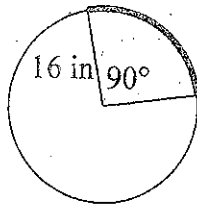
$$\frac{140\pi}{\pi} = \frac{\pi\theta}{\pi}$$

Area (directions on front)

$$A = \frac{\pi(16)^2(90)}{360}$$

$$A = \frac{64 \cdot 256\pi}{4}$$

$$A = 64\pi \text{ in}^2$$



9. The area of a circle is 225π square inches. Find the area of the sector whose central angle is 45° .

$$225\pi = \pi r^2$$

$$A = \pi r^2 \left(\frac{45}{360}\right)$$

$$A = \frac{5 \cdot 15 \cdot 225\pi}{360}$$

$$A = \frac{225\pi}{8} \text{ in}^2$$

10. The central angle of a sector is 60° and the area of the circle is 144π . What is the area of the sector?

$$A = \frac{24 \cdot 144\pi}{360}$$

$$A = 24\pi \text{ in}^2$$

11. A circle has a radius of 12. Find the area of the sector whose central angle is 120° .

$$A = \frac{\pi(12)^2(120)}{360} = \frac{48 \cdot 144\pi}{360} = 48\pi$$

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

$$9\pi = \frac{\pi r^2(90)}{360} \Rightarrow 36\pi = \pi r^2$$

$$36 = r^2$$

$$r = 6$$

13. The central angle of a sector is 72° and the sector has an area of 5π . Find the radius.

$$5\pi = \frac{\pi r^2(72)}{360} \Rightarrow 25\pi = \pi r^2$$

$$25 = r^2$$

$$r = 5$$

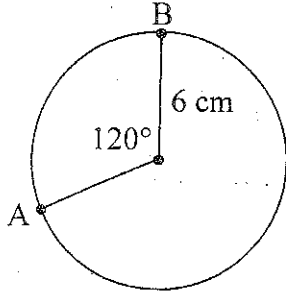
14. Find the measure of the central angle of a sector if its area is 5π and the radius is 6.

$$5\pi = \frac{\pi(36)\theta}{360}$$

$$50\pi = \frac{\pi\theta}{10}$$

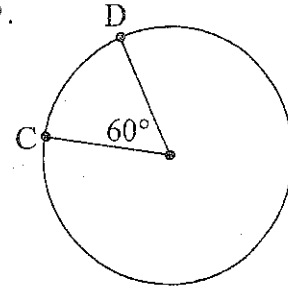
$$\theta = 50^\circ$$

1. Find the length of arc AB .



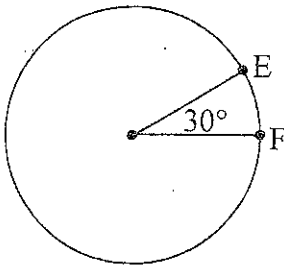
Arc: _____

2. The diameter is 24 cm. Find the length of arc CD .



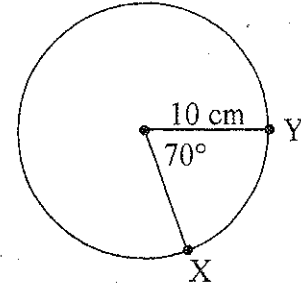
Arc: _____

3. The length of arc EF is 5π in. Find the length of the radius.



Radius: _____

4. Find the length of arc XY .



Arc: _____

5. A circle has an arc whose measure is 80° and whose length is 88π . What is the diameter of the circle?

6. A circle has a circumference whose length is 25π . Find the length of an arc whose central angle is 90° .

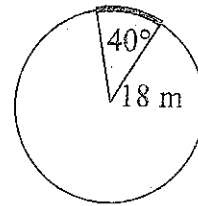
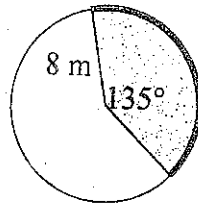
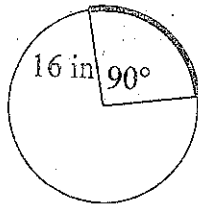
7. Find the measure of the central angle of an arc if its length is 14π and the radius is 18.

8. Calculate the sector area:

a.

b.

c.



9. The area of a circle is 225π square inches. Find the area of the sector whose central angle is 45° .
10. The central angle of a sector is 60° and the area of the circle is 144π . What is the area of the sector?
11. A circle has a radius of 12. Find the area of the sector whose central angle is 120° .
12. Find the radius of a circle which has a sector area of 9π whose central angle is 90° .
13. The central angle of a sector is 72° and the sector has an area of 5π . Find the radius.
14. Find the measure of the central angle of a sector if its area is 5π and the radius is 6.