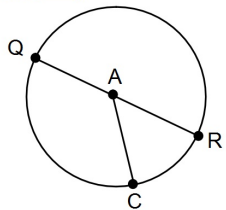Tuesday, April 21, 2020

Sec 10-7 Areas of Circles and Sectors

Area of a circle: $A = \pi r^2$

Find the area of circle A to the nearest tenth. $\overline{QR}$ is a diameter.
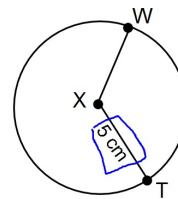
QR=24 in

$A = \pi r^2$

diameter = 24 in

radius = dia ÷ 2 = 24÷2 = 12 in

$A = \pi(12)^2 =$ 452.4 in²

Find the area of circle X. Give answer in terms of π.

W

X

5 cm

T

$A = \pi r^2$

$\overline{XT}$ is a radius: r = 5 cm

$A = \pi (5)^2 =$ 25π cm²

Find the length of the radius if the area of a circle is 180 ft². Round to the nearest hundredth.

$$A = \pi r^2$$

$$\frac{180}{\pi} = \frac{\pi r^2}{\pi}$$

$$r^2 = \frac{180}{\pi} \longrightarrow r = \sqrt{\frac{180}{\pi}} = \boxed{7.57 \text{ ft}}$$

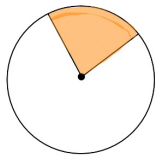Find the length of the diameter if the area of a circle is 225π m².

$$A = \pi r^2$$

$$\frac{225\pi}{\pi} = \frac{\pi r^2}{\pi}$$

$$r^2 = 225 \longrightarrow r = \sqrt{225} = 15$$

$$\text{diameter} = 2 \cdot r = 2 \cdot 15 = \boxed{30 \text{ m}}$$

Sector of a Circle: Part of a circles area.

It's formed by two radii and the arc connecting the ends of the radii.

The shaded region to the left is an example of a sector.
It's like a slice of pizza.

Finding the area of a sector is a lot like finding the length of an arc.
You can use a proportion similar to the one used to find the length of an arc.

Degrees		Area

$$\frac{\text{part of a circle in degrees}}{\text{the whole circle in degrees}} = \frac{\text{part of the circles area}}{\text{the whole area of the circle}}$$

Area of a Sector proportion:

$$\frac{\text{measure of a Central } \angle}{360°} = \frac{\text{Area of the sector (x)}}{\text{Area of the circle } (\pi r^2)}$$

Remember the measure of a Central Angle is the same as the measure of it's corresponding arc.

Find the area of shaded sector in circle Q to the nearest hundredth.
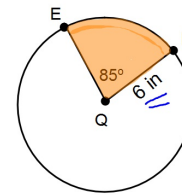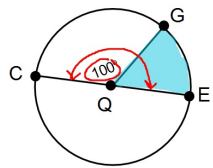

1st:
Area of the circle: $\pi(6)^2 = 36\pi$

2nd: write the proportion
$$\frac{85°}{360°} = \frac{x}{36\pi}$$

3rd: cross-multiply
$$x = 26.70 \text{ in}^2$$

In circle Q find the area of the sector formed by $\overset{\frown}{EG}$. $\overline{CE}$ is a diameter and CE=20 ft. Leave your answer in terms of π.

1st: find the measure of $\overset{\frown}{EG}$.

$m\overset{\frown}{EG} = 180° - m\overset{\frown}{CG} = 180° - 100° = 80°$

2nd: find the area of the circle:
r = dia÷2 = 20÷ 2 = 10 ft
$A = \pi(10)^2 = 100\pi$

3rd: write the proportion: $\frac{80°}{360°} = \frac{x}{100\pi}$

4th: cross-multiply: $x = 69.81 \text{ ft}^2$

The area of the shaded sector in circle A is 75 in^2. Find the radius of the circle.
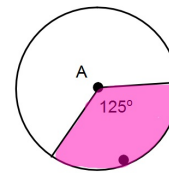
1st: set up the proportion
$$\frac{125°}{360°} = \frac{75}{\text{area of the circle}}$$

2nd: solve for the area of the circle
area of the circle $= 216$

3rd: solve for the radius
$$\pi r^2 = 216 \longrightarrow r^2 = \frac{216}{\pi}$$

$$r = \sqrt{\frac{216}{\pi}} = 8.29 \text{ in}$$

You can now do Practice #19

Y