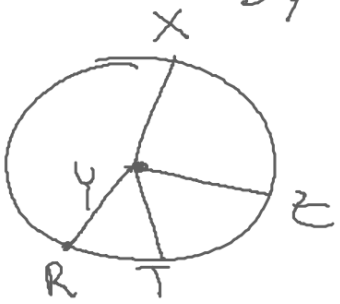
Central Angle – Angle with the vertex at the center of the circle

Intercepted Arc – Part of the circle cut out by an angle

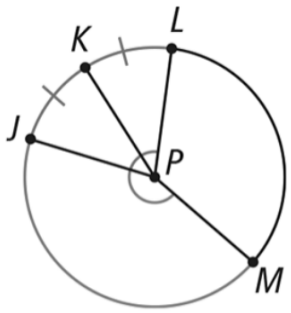


Intercepted Arc $\overset{\frown}{XZ}$

Arc Measure

The measure of an arc is equal to the measure of its corresponding central angle.

$m\overset{\frown}{JM} = m\angle JPM$



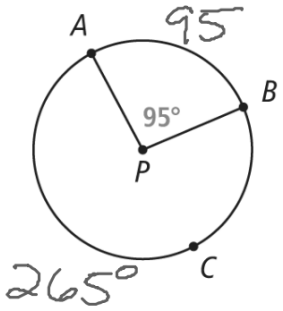
Congruent central angles intercept congruent arcs, and congruent arcs are intercepted by congruent central angles.

$\angle JPK \cong \angle KPL$ $\qquad$ $\overset{\frown}{JK} \cong \overset{\frown}{KL}$

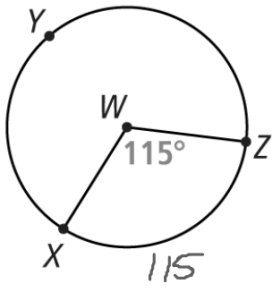
What are $m\overset{\frown}{AB}$ and $m\overset{\frown}{ACB}$?

SOLUTION

360-95



1. Use $\odot W$.



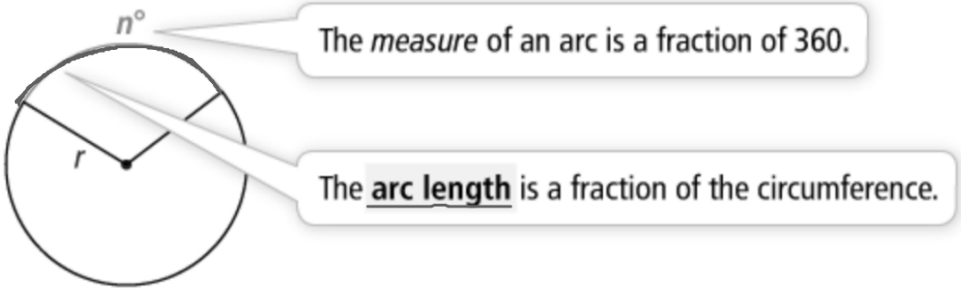
a. What is $m\overset{\frown}{XZ}$?

Enter your answer.

b. What is $m\overset{\frown}{XYZ}$? 360−115

245°

A. How do you find the length *s* of an arc measured in degrees?



Use a proportion to represent the relationship between arc length *s*, radius *r*, and arc measure *n*.

s = arc length

$$\frac{\text{arc length}}{\text{circumference}} = \frac{\text{arc measure}}{360}$$

$$\frac{s}{2\pi r} = \frac{n}{360}$$

$$s = \frac{n}{360} \cdot 2\pi r$$

$\frac{\text{Angle measure}}{360} \cdot \text{Circumference}$

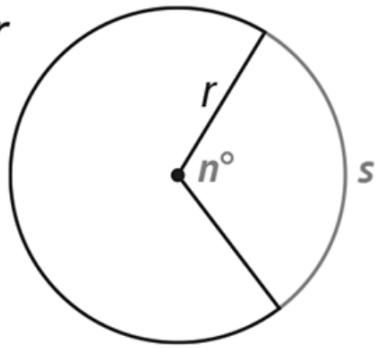
The formula to find the length of an arc is $s = \frac{n}{360} \cdot 2\pi r$.

Arc Length

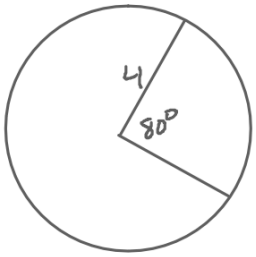
The length *s* of an arc of a cirlce is the product of the ratio relating the measure of the central angle in degrees to 360 and the circumference of the circle.

Central angle in degrees:

$$s = \frac{n}{360} \cdot 2\pi r$$



2. a. In a circle with radius 4, what is the length of an arc that has a measure of 80? Round to the nearest tenth.



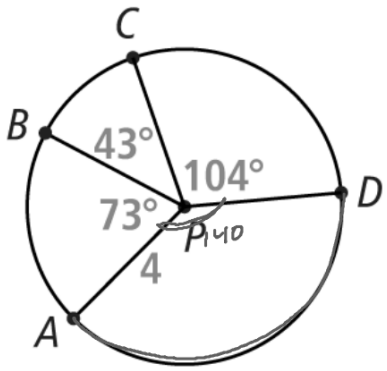
$$S = \frac{n}{360} \cdot 2\pi r$$

$$= \frac{80}{360} \cdot 2\pi(4)$$

$$= \frac{2}{9} \cdot 8\pi$$

$$= \frac{16\pi}{9} \approx 5.6$$

What is the length of $\overset{\frown}{AD}$? Express the answer in terms of π.



$$S = \frac{140}{360} \cdot 2\pi(4)$$

$$= \frac{7}{18} \cdot 8\pi$$

$$= \frac{56\pi}{18}$$

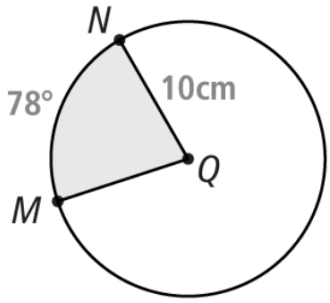
$$= \frac{28\pi}{9}$$

A sector of a circle is the region bounded by two radii and the intercepted arc. What is the area of sector *MQN*?

$\frac{78}{360} \cdot \pi(10)^2$

$\frac{13}{60} \cdot 100\pi$

$\frac{1300\pi}{60} = \frac{65\pi}{3}$ cm^2

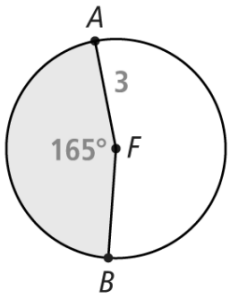


Area of a Sector

The area of a sector is $A = \frac{n}{360} \cdot \pi r^2$, where *n* is the measure of the intercepted arc and *r* is the radius of the circle.

$\frac{\text{Angle}}{360} \cdot \text{Area}$

4. a. What is the area of the sector?



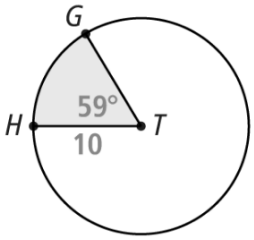
Enter your answer.

$A = \frac{165}{360} \cdot \pi(3)^2$

$\frac{11}{24} \cdot 9\pi = \frac{99\pi}{24} = \frac{33\pi}{8}$

CHECK ANSWER

4. b. What is the area of the sector?



Enter your answer.

$\frac{59}{360} \cdot \pi(10)^2$

$\frac{59}{360} \cdot 100\pi$

$\frac{5900\pi}{360} = \frac{295\pi}{18}$

A segment of a circle is the part of a circle bounded by an arc and the segment joining its endpoints. What is the area of the shaded region?

$A = \frac{1}{2}bh$

Area of Sector − Area of $\triangle$

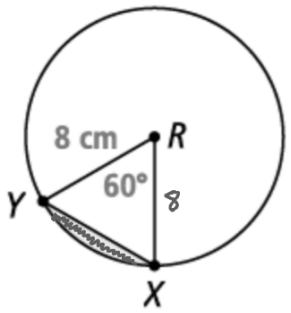
$\frac{60}{360} \cdot \pi(8)^2 - \frac{1}{2}(8)(8)\sin 60°$

$\frac{1}{6} \cdot 64\pi - 32\sin 60°$

$\frac{64\pi}{6} - 32\sin 60°$

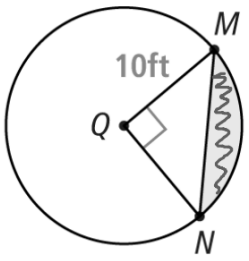
$\frac{32\pi}{3} - 27.7$

$5.81\ cm^2$



$A_\triangle = \frac{1}{2}ab\sin C$

5. a. What is the area of the segment?

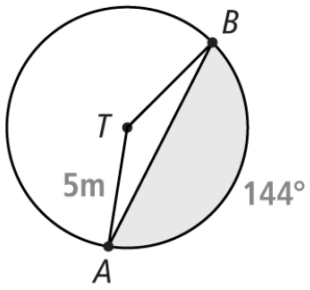


$\frac{90}{360} \cdot \pi(10)^2 - \frac{1}{2}(10)(10)\sin 90°$

$\frac{1}{4} \cdot 100\pi - 50\sin 90$

$25\pi - 50\ ft^2$

5. b. What is the area of the segment?



Enter your answer

$\frac{144}{360} \cdot \pi(5)^2 - \frac{1}{2}(5)(5)\sin 144$

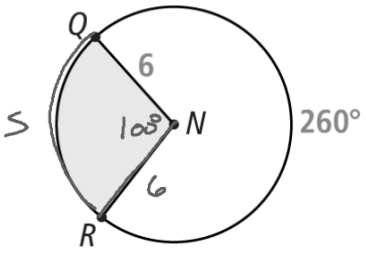
$\frac{2}{5} \cdot 25\pi - \frac{25}{2}\sin 144$

$10\pi - 7.35$

$24.07\ m^2$

6. What is the area and perimeter of sector *QNR*?
Round to the nearest tenth.

$m\angle QNR =$



$A = \frac{100}{360} \cdot \pi(6)^2$

$\frac{5}{18} \cdot 36\pi$

10π

$S = \frac{100}{360} \cdot 2\pi(6)$

$\frac{5}{18} \cdot 12\pi$

$\frac{10\pi}{3} + 6 + 6$

$\frac{10\pi}{3} + 12$

$\frac{10\pi + 36}{3}$

$\frac{10\pi}{3} + \frac{12}{1} \cdot \frac{3}{3}$

$\frac{10\pi}{3} + \frac{36}{3}$