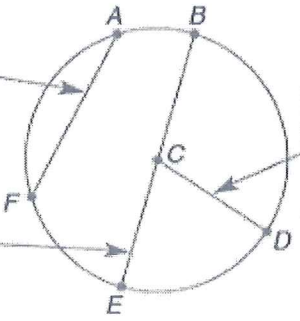
Name: Key

Parts of Circle Notes

Parts of Circles A **circle** is the locus of all points in a plane equidistant from a given point called the **center** of the circle. A circle is usually named by its center point. The figure below shows circle C, which can be written as ⊙C. Several special segments in circle C are also shown.

Any segment with both endpoints that are on the circle is a **chord** of the circle. $\overline{AF}$ and $\overline{BE}$ are chords.

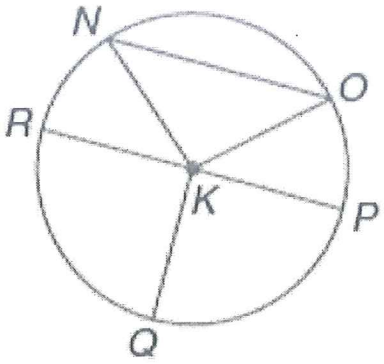
A chord that passes through the center is a **diameter** of the circle. $\overline{BE}$ is a diameter.



Any segment with endpoints that are the center and a point on the circle is a **radius**. $\overline{CD}$, $\overline{CB}$, and $\overline{CE}$ are radii of the circle.

The plural of radius is *radii*, pronounced RAY-dee-eye. The term *radius* can mean a segment or the measure of that segment. This is also true of the term *diameter*.

Now you try ....



Example 1.

Name the circle: ⊙K

Name a radius: $\overline{KP}$, $\overline{KO}$, $\overline{KR}$, $\overline{OK}$, $\overline{NK}$, then all when we flip the order too!

Name a diameter: $\overline{RP}$ or $\overline{PR}$

Radius $= \frac{1}{2} \cdot$ diameter

Example $d = 13m$

$r = \frac{1}{2}13 \Rightarrow \boxed{r = 6.5m}$

Diameter $= 2r$

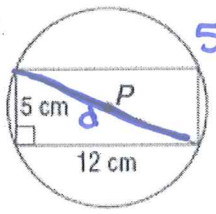
Example: $r = 21cm$

$d = 2 \cdot 21$

$d = 42cm$

Directions: Find the diameter, radius, circumference and area.

Ex. 2



$5^2+12^2=d^2$

$169=d^2$

$\sqrt{169}=d$

$13=d$

d= 13cm

r= 6.5cm

$C=d\pi$

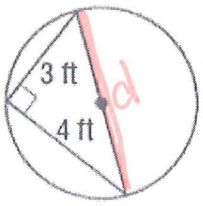
C= 13π cm

$A=\pi r^2$

$A=\pi(6.5)^2$

A= 42.25π cm^2

Ex. 3.



$3^2+4^2=d^2$

$25=d^2$

$\sqrt{25}=d$

$5=d$

d= 5ft

r= 2.5ft

$C=d\pi$

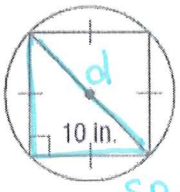
C= 5π ft

$A=\pi r^2$

$A=\pi(2.5)^2$

A= 6.25π ft^2

Ex. 4.



Sp. RT Δ

d= $10\sqrt{2}$ in

r= $5\sqrt{2}$ in

$C=d\pi$

C= $10\sqrt{2}\pi$ in

$A=\pi r^2$

$A=\pi(5\sqrt{2})^2$

$A=\pi 25\cdot 2$

A= 50π in^2

Ex. 5. Find the radius and diameter when the circumference is 22π.

$C=d\pi$ $C=22\pi$

$\frac{22\pi}{\pi}=\frac{d\pi}{\pi}$

$22=d$

$r=\frac{1}{2}22$

d= 22

r= 11

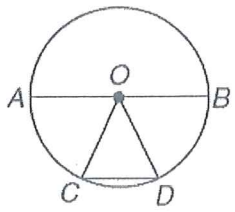
1. Parts of A Circle Independent Practice:

a. Name the circle.

$\odot O$

b. Name the radii of the circle.

$\overline{AO}$, $\overline{OB}$, $\overline{OC}$, $\overline{DO}$



c. Name the chords of a circle.

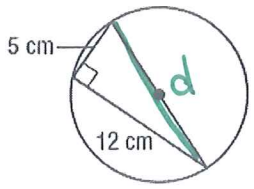
Just $\overline{AB}$

d. Name the diameter of the circle.

$\overline{AB}$

Directions: Find the diameter, radius, circumference and area.

2.



$5^2+12^2=d^2$

$25+144=d^2$

$169=d^2$

$13=d$

$A=\pi r^2$

$A=\pi(6.5)^2$

d= 13cm r= 6.5 cm C= 13π cm A= 42.25π cm^2

3. Find the circumference of a circle with the radius of $r=3\sqrt{2}$. Use exact values.

$C=d\pi$ $r=3\sqrt{2}$ $d=6\sqrt{2}$

$C=6\sqrt{2}\pi$

4. If the radius of a circle is 4 what is the diameter and what is the circumference?

$r=4$

$d=8$ $C=8\pi$

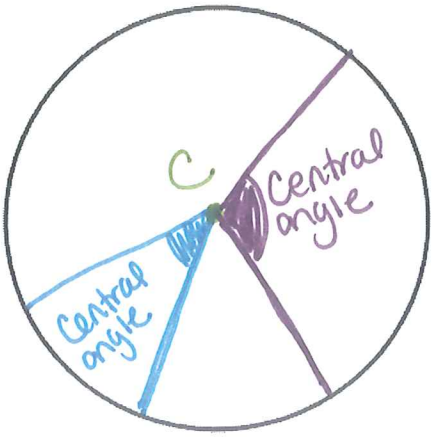
5. If the diameter of a circle is 6, find the radius and circumference.

$d=6$

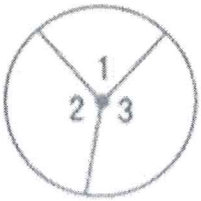
$r=3$

$C=6\pi$

What is the Central Angle?

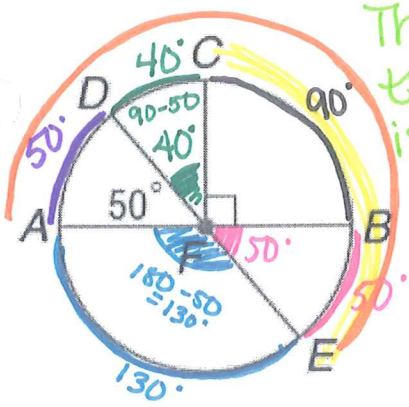


The sum of the measures of the central angle of a circle, with no interior points in common, is 360°.



$m<1+m<2+m<3=$ 360°

Example 6. **Arc Measure**: Find the $m\widehat{BE}, m\widehat{CBE}, and\ m\widehat{ACE}$



The measure of the central angle is equal to the MEASURE of the arc.

$m\widehat{BE} = 50°$

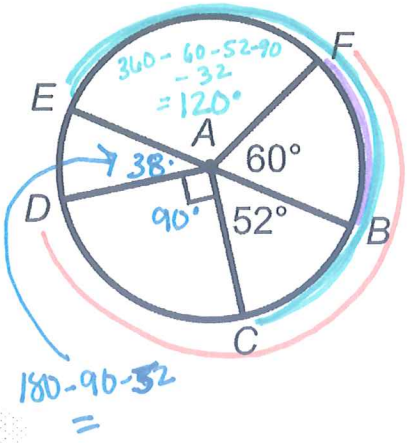
$m\widehat{CBE} = 90 + 50 = 140°$

$m\widehat{CBE} = 140°$

$m\widehat{ACE} =$ $50 + 40° + 90° + 50°$

$m\widehat{ACE} = 230°$

Example 7. Find the measure of each arc.



$m\widehat{FB} = 60°$

$m\widehat{EC} = 38° + 90° = 128°$

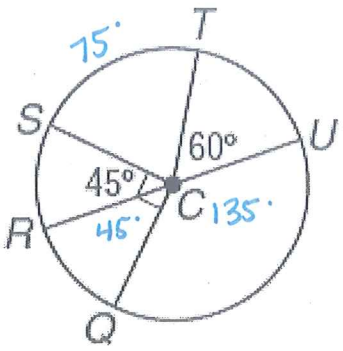
$m\widehat{EFC} = 120 + 60 + 52 = 232°$

$m\widehat{FBD} = 60 + 52 + 90$
$= 202°$

Arc Measure Independent Practice:

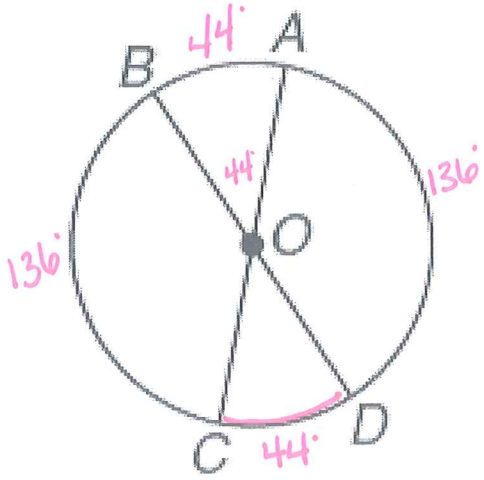
Find each measure.

1. $m\angle SCT = 75°$
2. $m\angle SCU = 135°$
3. $m\angle SCQ = 45°$
4. $m\angle QCT = 165°$



In $\odot O$, $m\angle BOA = 44$. Find each measure.

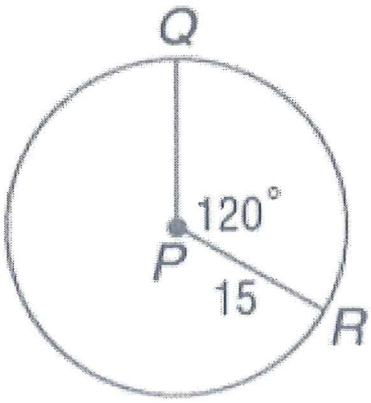
5. $m\widehat{BA} = 44°$
6. $m\widehat{BC} = 136°$
7. $m\widehat{CD} = 44°$
8. $m\widehat{ACB} = 316°$
9. $m\widehat{BCD} = 180°$
10. $m\widehat{AD} = 136°$



Recall: Arc Length.
With your shoulder partner, describe what arc length is and how you find it. Record your answers here.

arc length is a fraction of the distance of the circumference. $\ell = \frac{a}{360} C$

Example 8: Find length of $\overset{\frown}{QR}$



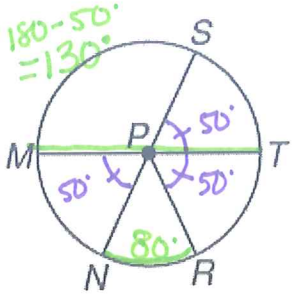
$a = 120$ $C = 30\pi$
$r = 15$
$d = 30$

Arc Length = $\frac{120}{360} \cdot 30\pi$

$= \frac{3600\pi}{360}$

$\ell = 10\pi$ units

Review of all concepts! (Together)
Example 9: If $m\angle RPT = 50°$, $\angle SPT \cong \angle RPT$ the radius is 7.5cm. Find the following:



Name a diameter: $\overline{MT}$ or $\overline{SN}$

Name a radius: $\overline{PS}, \overline{PT}, \overline{PR}, \overline{PN}, \overline{PM}$

D = $2(7.5) = 15$cm

Find the circumference: $C = d\pi$ $C = 15\pi$ cm

$50 + 80 + 50 + 50$

$m\overset{\frown}{MTS}$ = 230° ← This is just the measure NOT length.

Find the arc length of $\overset{\frown}{MTS}$ = $\frac{115\pi}{12}$ cm

$\ell = \frac{230}{360} \cdot 15\pi$

$= \frac{3450\pi}{360}$

Find the arc length of $\overset{\frown}{MS}$ = $\frac{65\pi}{12}$ cm

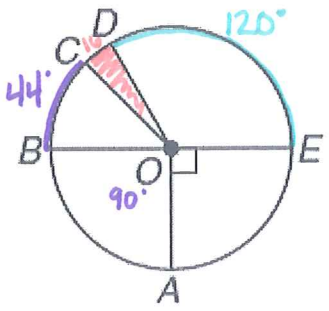
$m\overset{\frown}{MS} = 130°$

$\ell = \frac{130}{360} \cdot 15\pi$

$\frac{1950\pi}{360}$

Review: Independent Practice:

1. If $m\angle DOE = 120°$, $m\angle DOC = 16°$, the radius is 12cm. Find the following:



Name a diameter: $\overline{BE}$

Name a radius: $\overline{OB}, \overline{OE}, \overline{OA}, \overline{OC}, \overline{OD}$

D = 24 cm

Find the circumference: 24π cm

$m\widehat{DBA}$ = 150°

$m\widehat{CB}$ = 60°

$16 + 44 + 180$

$m\widehat{DBE}$ = 240°

$m\widehat{DC}$ = 16°

Find the arc length of $\widehat{DBA}$ = 10π cm

$\ell = \frac{150}{360} \cdot 24\pi$

$\ell = \frac{3600\pi}{360}$

Find the arc length of $\widehat{CB}$ = 4π cm

$\ell = \frac{60}{360} \cdot 24\pi$

$\ell = \frac{1440\pi}{360}$

Find the arc length of $\widehat{DBE}$ = 16π cm

$\ell = \frac{240}{360} \cdot 24\pi$

$\ell = \frac{5760\pi}{360}$

Find the arc length of $\widehat{DC}$ = $\frac{16\pi}{15}$ cm

$\ell = \frac{16}{360} \cdot 24\pi$

$\ell = \frac{384\pi}{360}$