Day 1 Notes: Angles

Circle- All points equidistant from a given point called the center

Circle Y or ⊙Y

Radius- a segment from the center to a point on the circle

$\overline{AY}$, $\overline{CY}$, $\overline{MY}$

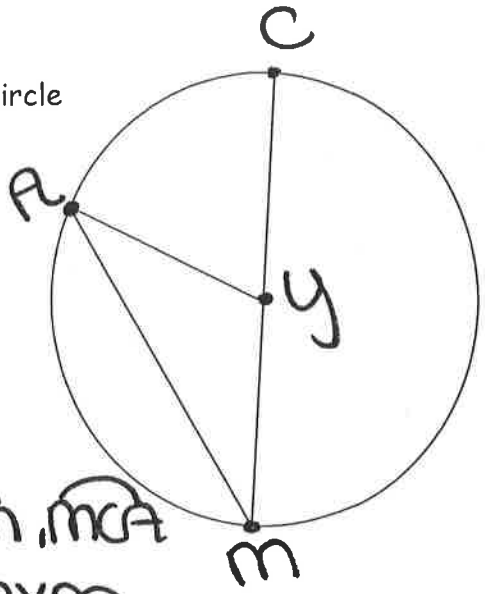
Diameter- a segment that contains the center and endpoints on the circle

$\overline{MC}$, $\overline{CM}$

Semicircle- half a circle (180 degrees)

3 points MAC, CAM

Arc- part of a circles circumference



Minor Arc- arc that measures less than 180 degrees

$\overset{\frown}{AC}$, $\overset{\frown}{CA}$, $\overset{\frown}{AM}$, $\overset{\frown}{MA}$

Major Arc- arc that measures greater than 180 degrees

3 points $\overset{\frown}{CMA}$, $\overset{\frown}{AMC}$, $\overset{\frown}{ACM}$, $\overset{\frown}{MCA}$

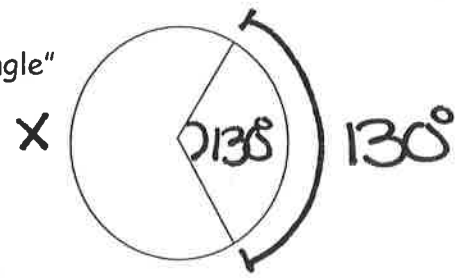
Central Angle- Angle whose vertex is the center of the circle

$\measuredangle AYC$, $\measuredangle AYM$

Circumference: $C = \pi d$ or $C = 2\pi r$

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

Arc Measure- "Central Angle"



$X = 360 - 130$

$X = 230°$

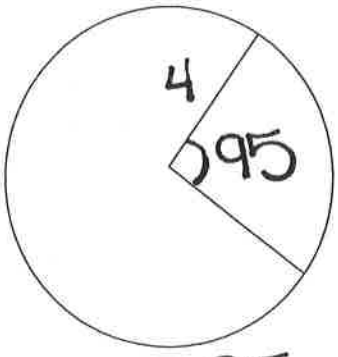
Arc Length- the distance between two points on a circle

In Degrees:

$$\frac{measure\ of\ central\ angle}{360} * (2\pi r)$$

In Radians:

$$\frac{measure\ of\ central\ angle}{2\pi} * (2\pi r)$$

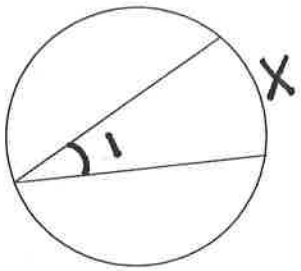


$\frac{95}{360} \cdot 2\pi 4$

$= 6.63$

Angles in Circles:

N the Circle: = $\frac{1}{2}$ (arc)



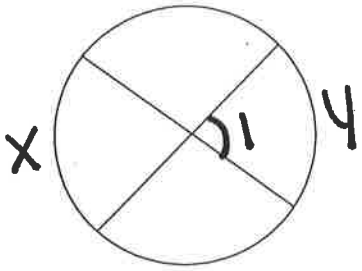
$$m\angle 1 = \frac{1}{2}X$$

Ex: X=120; Find m∠1

$m\angle 1 = \frac{1}{2}(120)$

$m\angle 1 = 60°$

IN the Circle = $\frac{1}{2}$ (sum of arcs)



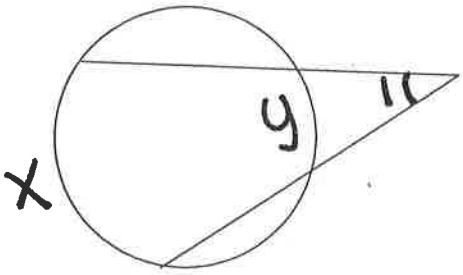
$$m\angle 1 = \frac{1}{2}(x+y)$$

Ex: X=60, Y=40; Find m∠1

$m\angle 1 = \frac{1}{2}(60+40)$

$m\angle 1 = 50°$

OUTSIDE the circle = $\frac{1}{2}$ (difference of arcs)



$$m\angle 1 = \frac{1}{2}(x-y)$$

Ex: X=120, Y=40; Find m∠1

$m\angle 1 = \frac{1}{2}(x-y)$

$m\angle 1 = \frac{1}{2}(120-40)$

$m\angle 1 = 40$

Area of a sector

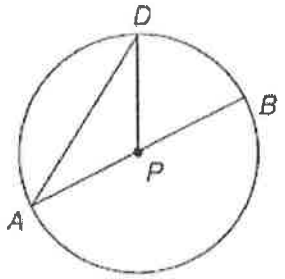
$$A = \frac{n}{360}\pi r^2$$

$$A = \frac{x}{2\pi r}\cdot \pi r^2$$

Day 1 Classwork: Name: Key

PARTS OF A CIRCLE:

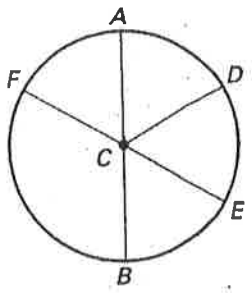
Refer to the figure at the right.



1. Name the center of $\odot P$.
   Point P
2. Name the three radii of the circle.
   $\overline{PA}$, $\overline{PB}$, $\overline{PD}$
3. Name a diameter.
   $\overline{AD}$, $\overline{AB}$

ARCS:

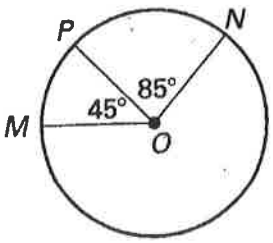
Determine whether the arc is a *minor arc*, a *major arc*, or a *semicircle* of $\odot C$.



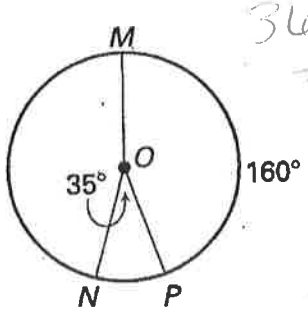
5. $\overset{\frown}{FA}$ minor
6. $\overset{\frown}{BE}$ minor
7. $\overset{\frown}{BDA}$ semi
8. $\overset{\frown}{FB}$ minor

ARC MEASURE:

Find the measure of $\overset{\frown}{MN}$.

9. 

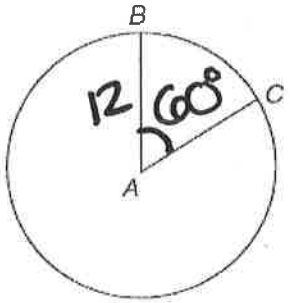
45+85
130°

10. 

360 − 35 − 160 = 165°

ARC LENGTH:

11. In $\odot A$, $AB = 12$ and $m\angle BAC = 60$. Find the length of $\overset{\frown}{BC}$.

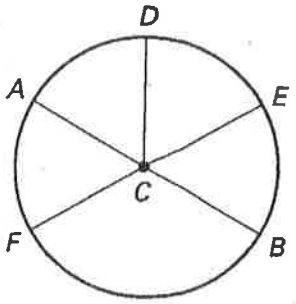


$= \frac{x}{360} \cdot 2\pi r$

$\frac{60}{360} \cdot 2\pi(12) = 12.6$

You Try:

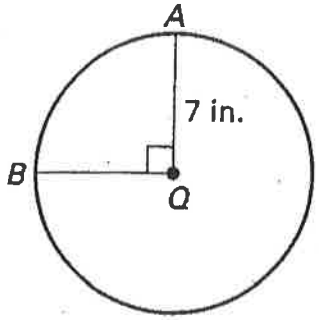
Determine whether the arc is a *minor arc*, a *major arc*, or a *semicircle* of ⊙C.



1. $\overset{\frown}{AE}$ minor
2. $\overset{\frown}{ADB}$ semi
3. $\overset{\frown}{FDE}$ semi
4. $\overset{\frown}{DFB}$ major

Find the length of $\overset{\frown}{AB}$.

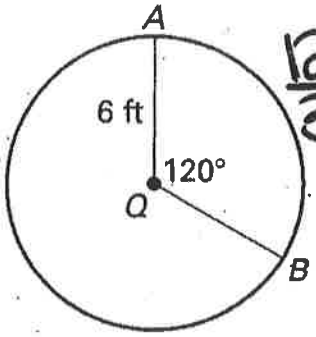
7.



$\frac{90}{360} \cdot 2\pi(7)$

11 inches

8.

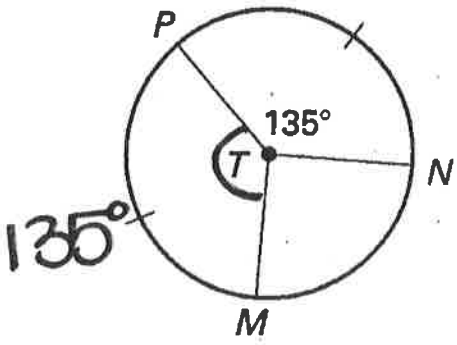


$\frac{120}{360} \cdot 2\pi(6)$

12.6ft

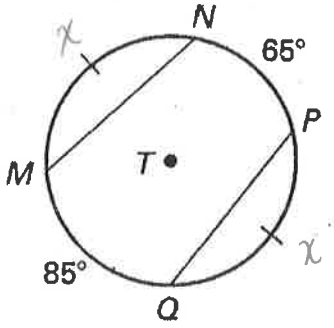
Find the measure of $\overset{\frown}{MN}$.

9.



90°

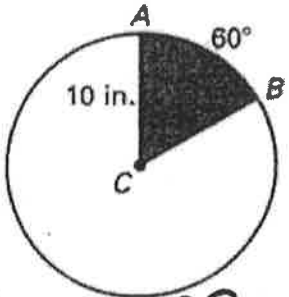
10. $360 = 65 + 85 + 2x$



105°

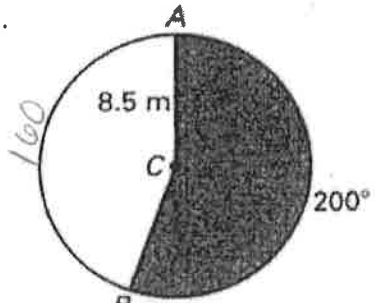
Find the area of the shaded region.

11.



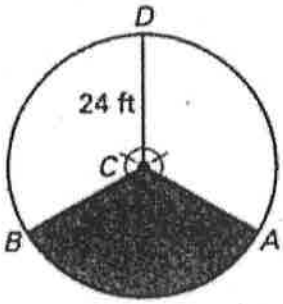
$\frac{60}{360} \cdot \pi(10)^2 = 52.4 in^2$

12.



$\frac{200}{360} \cdot \pi(8.5)^2 = 126.1 m^2$

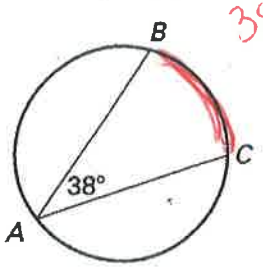
13.



$\frac{120}{360} \cdot \pi(24)^2 = 603.2 ft^2$

Find the measure of the indicated arc or angle.

1. $m\widehat{BC}$ = ?



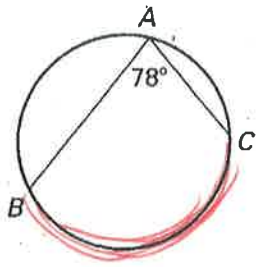
$38 = \frac{1}{2}\widehat{BC}$

$38 \cdot 2 = \widehat{BC}$

$76 = \widehat{BC}$

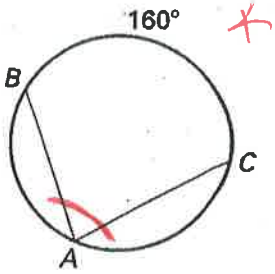
76

2. $m\widehat{BC}$ = ?



156

3. $m\angle BAC$ = ?

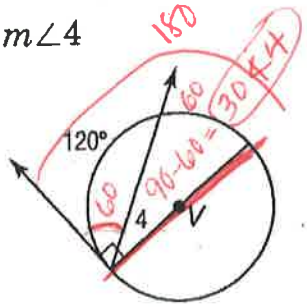


$\measuredangle BAC = \frac{1}{2}(160)$

80

Find each measure.

4. $m\angle 4$



180

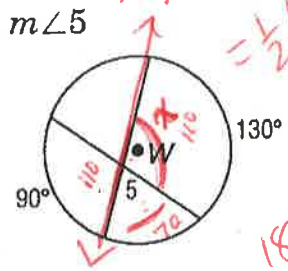
60

60

$90-60=30\measuredangle 4$

30°

5. $m\angle 5$



$\measuredangle X = \frac{1}{2}(130+90)$

$= \frac{1}{2}(220)$

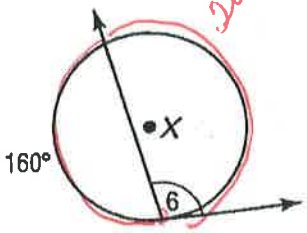
$= 110$

$180-110$

$=70$

70°

6. $m\angle 6$



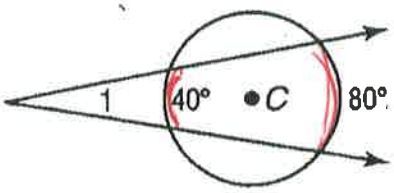
200

100°

$\measuredangle 6 = \frac{1}{2}(200)$

$=100$

7. $m\angle 1$



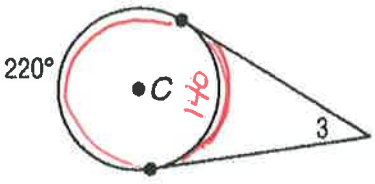
20°

$m\measuredangle 1 = (80-40)\frac{1}{2}$

$= 40(\frac{1}{2})$

$= 20°$

8. $m\angle 3$



140

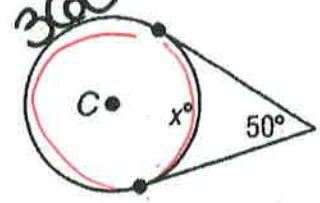
40°

$m\measuredangle 3 = \frac{1}{2}(220-140)$

$= \frac{1}{2}(80)$

$= 40°$

9. x



$360-x$

$\frac{1}{2}(360-x-x)=50$

$\frac{1}{2}(360-2x)=50$

$180-1x=50$

$-180 \quad -180$

$x=130°$

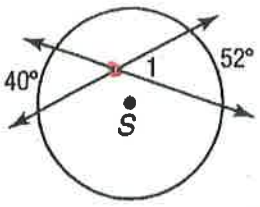
$\frac{-1x}{-1} = \frac{-130}{-1}$

$x=130°$

You Try:

Find each measure.

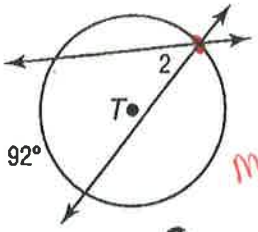
1. $m\angle 1$ inside



$m\angle 1 = \frac{1}{2}(40+52)$
$= \frac{1}{2}(92)$
$= 46$

46°

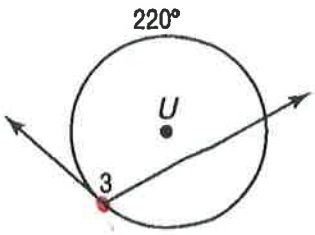
2. $m\angle 2$ on



$m\angle 2 = \frac{1}{2}(92)$
$= 46$

46°

3. $m\angle 3$ on

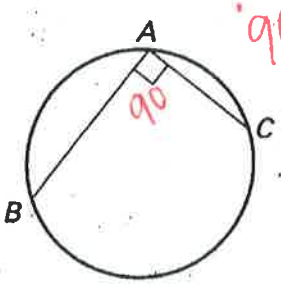


110°

$m\angle 3 = \frac{1}{2}(220)$
$= 110$

Find the measure of the indicated arc or angle.

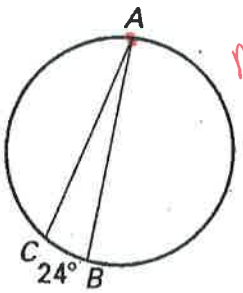
4. $m\overset{\frown}{BC}$ = ?



$\cdot 2 \quad \cdot 2$
$90 = \frac{1}{2}\overset{\frown}{BC}$
$180 = \overset{\frown}{BC}$

180°

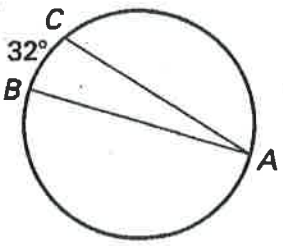
5. $m\angle BAC$ = ?



$m\angle BAC = \frac{1}{2}(24)$
$= 12$

12°

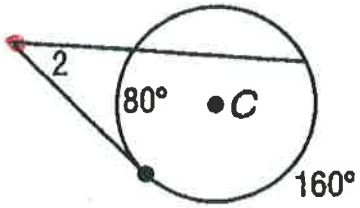
6. $m\angle BAC$ = ?



16°

7. $m\angle 2$

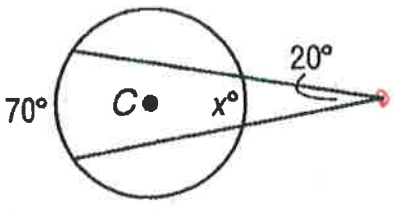
outside



40°

$m\angle 2 = \frac{1}{2}(160-80)$
$= \frac{1}{2}(80)$
$= 40$

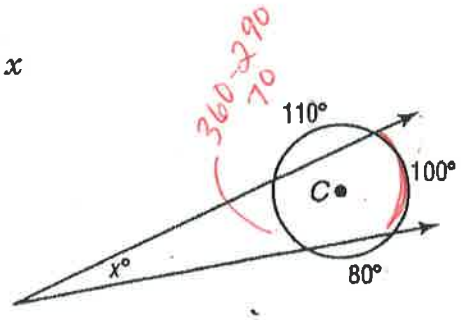
8. x



30°

$20 = \frac{1}{2}(70-x)$
$40 = 70 - x$
$-70 \quad -70$
$-30 = -x$
$30 = x$

9. x



15°

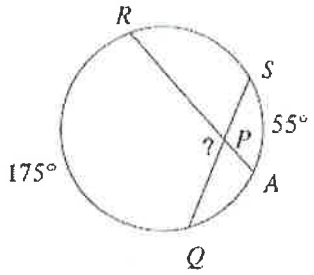
$360 - 290 = 70$

$x = \frac{1}{2}(100-70)$
$= \frac{1}{2}(30)$
$= 15$

Day 1 Homework: Angles in Circles

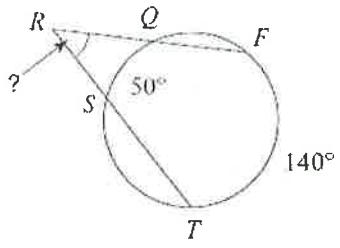
. ind the measure of the arc or angle indicated. Assume that lines which appear tangent are tangent.

1)



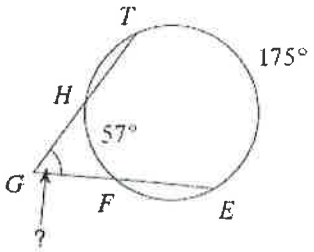
115°

2)



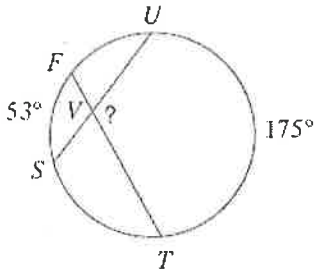
45°

3)



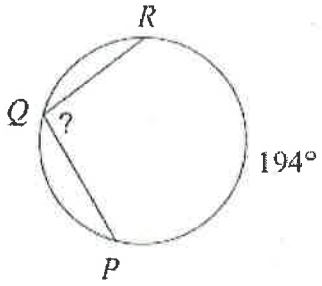
59°

4)



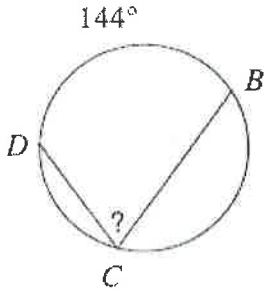
114°

5)



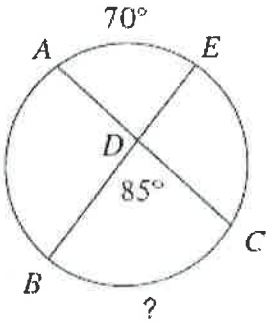
97°

6)



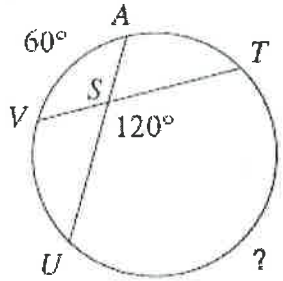
72°

7)



100°

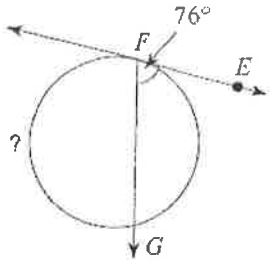
8)



180°

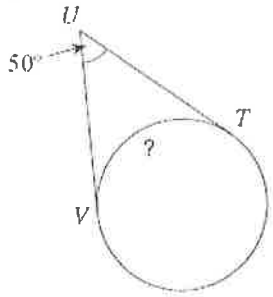
Find the measure of the arc or angle indicated. Assume that lines which appear tangent are tangent.

1)



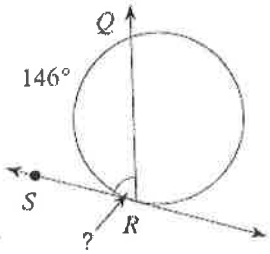
208°

2)



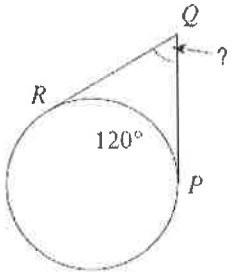
130°

3)

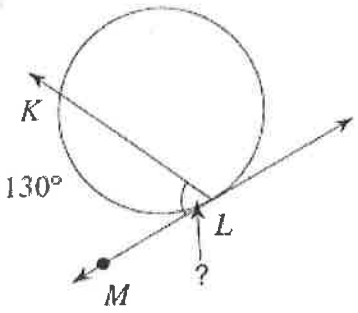


73°

4)

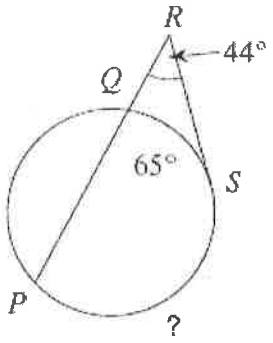


60°



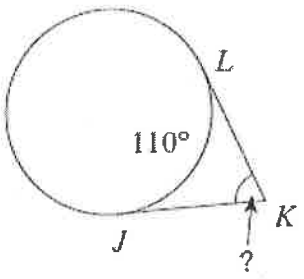
65°

6)



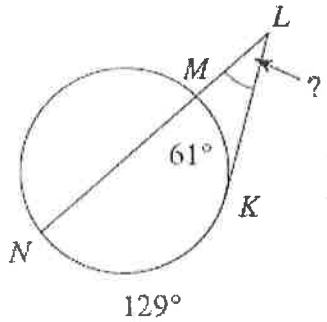
153°

7)



70°

8)



34°