NOTES 10.2 – ARCS, SEMICIRCLES, & CENTRAL ANGLES

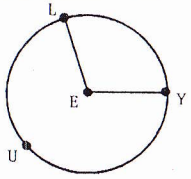
CENTRAL ANGLE:

An angle whose vertex is the center of the circle.

THEOREM: SUM OF CENTRAL ANGLES

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

EXAMPLE 1: Name the following.



The central angle: ∠LEY

The two arcs: $\overset{\frown}{LY}$ & $\overset{\frown}{LUY}$

MINOR ARC:

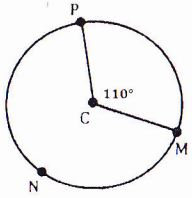
- An arc that measures less than 180°
- Named by its endpoints

MAJOR ARC:

- An arc that measures more than 180°
- Named by its endpoints and another point on the arc

Arcs are measured by their corresponding central angles.

EXAMPLE 2:

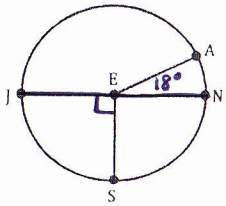


- $m\angle PCM =$ 110°
- $m\overset{\frown}{PM} =$ 110°
- $m\overset{\frown}{PNM} =$ 360-110 = 250°
- What kind of arc is $\overset{\frown}{PM}$? How do you know? minor - measure < 180°

SEMICIRCLES:

An arc that measures 180°.

EXAMPLE 3: In *circle* E, $m\angle AEN = 18°$, $\overline{JN}$ is a diameter, and $m\angle JES = 90°$. Find each measure.



a) $m\overset{\frown}{AN} =$ 18°

b) $m\overset{\frown}{JA} =$ 180-18=162°

c) $m\overset{\frown}{JAS} =$ 360-90=270°

EXAMPLE 4: $\overrightarrow{FD}$ is a tangent to *circle* O. Based on the angle measures given, find the measure of each of the following.

a) $m\overset{\frown}{AB} =$ 45°

b) $m\overset{\frown}{AD} =$ 140°

c) $m\overset{\frown}{AC} =$ 135°

d) $m\overset{\frown}{BC} =$ 90°

e) $m\overset{\frown}{ADC} =$ 225°

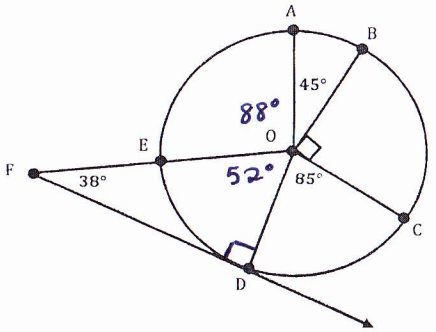
f) $m\overset{\frown}{ACD} =$ 220°

g) $m\overset{\frown}{ED} =$ 52°

h) $m\overset{\frown}{AE} =$ 88°

i) $m\angle DOF =$ 52°

j) $m\angle EOA =$ 88°



EXAMPLE 5: Find the measure of each of the following.

a) $m\angle AOB =$ 33°

b) $m\angle BOC =$ 132°

c) $m\angle COD =$ 81°

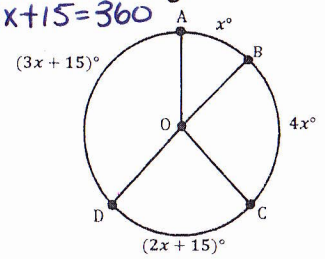
d) $m\angle AOD =$ 114°

x+4x+2x+15+3x+15=360

10x+30=360

10x=330

x=33



EXAMPLE 6: Find the measure of each arc in *circle* C and classify it. In the figure $\overline{PZ}$ is a diameter.

a) $m\overset{\frown}{PN}$ = 90° ; Minor

b) $m\overset{\frown}{ZQP}$ = 180° ; Semicircle

c) $m\overset{\frown}{RZ}$ = 55° ; Minor

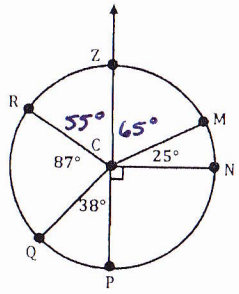
d) $m\overset{\frown}{ZMP}$ = 180° ; Semicircle

e) $m\overset{\frown}{RM}$ = 120° ; Minor

f) $m\overset{\frown}{NQP}$ = 270° ; Major

g) $m\overset{\frown}{QN}$ = 128° ; Minor

h) $m\overset{\frown}{RP}$ = 125° ; Minor



EXAMPLE 7: Find the indicated measures.

$x + 3x + 6 + 3x - 4 + 6x - 6 = 360$

$13x - 4 = 360$

$13x = 364$

$x = 28$

x = 28

$m\angle AEB$ = 28°

$m\angle BEC$ = 90°

$m\angle CED$ = 80°

$m\angle DEA$ = 162°