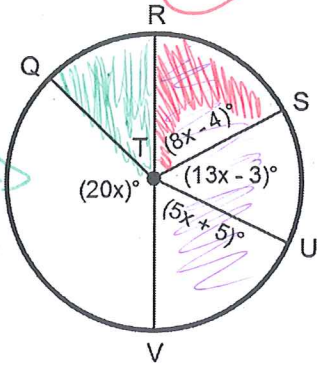# Geometry - 10.2 - Angles and Arcs

- A **Central** angle has the **Center** of a circle as its vertex and its sides are two **radii** of the circle. The sum of the **Central** angles with no interior points in common is **360°**.

Ex 1 - Find m∠RTS and m∠QTR.

half the circle

$m\angle RTS + m\angle STU + m\angle UTV = 180°$

$(8x-4) + (13x-3)(5x+5) = 180°$

$26x - 12 = 180°$
$+2 \qquad +2$
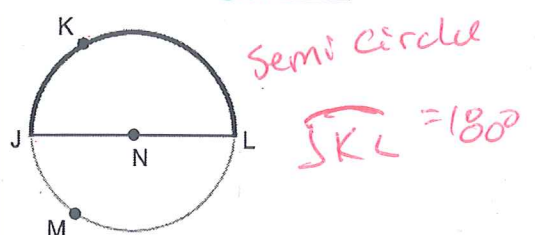
$\dfrac{26x}{26} = \dfrac{182°}{26}$

$x = 7$

$m\angle RTS = 8x-4$
$= 8(7)-4$
$= 56-4$
$= 52°$

$m\angle RTS = 52°$

$20(7)$
$140°$
$180°-140°$
$\angle QTR = 40°$

R, Q, S, T, (8x-4)°, (20x)°, (13x-3)°, (5x+5)°, U, V

- A central angle separates a circle into two parts, each of which is called an **arc**.

arc / minor Arc $\overset{\frown}{AC}$

major Arc $\overset{\frown}{DE}$ *OR* $\overset{\frown}{DFE}$

Semi circle $\overset{\frown}{JKL} = 180°$
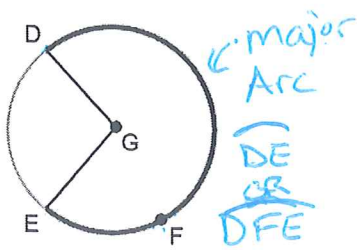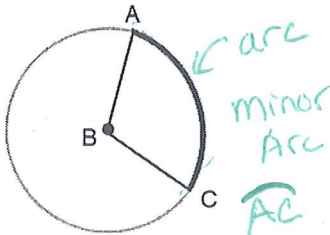
Ex 2 - If m∠NPM = 46°, $\overline{PL}$ bisects ∠KPM, and $\overrightarrow{OP} \perp \overline{KN}$, find:

K, L, J, P, M, O, N   67°, 67°, 46°
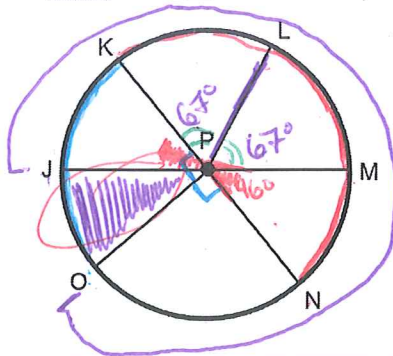
a) $m\overset{\frown}{OK}$

$90°$

b) $m\overset{\frown}{LM}$

$x + x + 46° = 180°$
$2x + 46° = 180°$
$\dfrac{2x}{2} = \dfrac{134}{2}$
$x = 67°$

c) $m\overset{\frown}{JKO}$

$360° - (90 - 46)$
$360° - 44$
$316°$

ARC LENGTH
Measure of Arc → $\dfrac{A}{360°}$ = $\dfrac{l}{2\pi r}$ ← arc length / ← circumference
Measure of circle →

Equivalently:

Ex 2 - If PR = 15 and m∠QPR = 120°, find $m\overset{\frown}{QR}$.

$\dfrac{A}{360°} = \dfrac{l}{2\pi (r)}$

$\dfrac{120°}{360°} = \dfrac{l}{2\pi(15)}$ $= \dfrac{1}{3} = \dfrac{l}{30\pi}$ $= l = 10\pi$

31.4 units

Q, P, R, 120°, 15