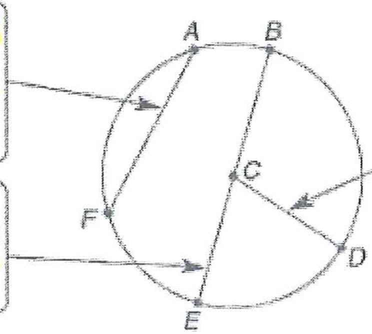
Name: *Key*

Parts of Circle

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.

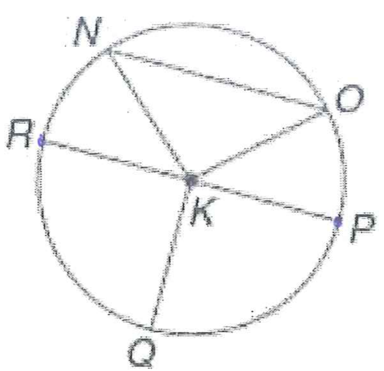
A chord that passes through the center is a **diameter** of the circle. $\overline{BE}$ is a diameter.



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 ....



Name the circle: Circle K or ⊙K

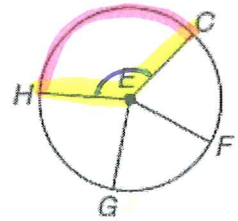
Name a radius: NK, PK, RK, QK, OK

Name a diameter: RP or PR

Radius = $\frac{1}{2}$ diameter or $\frac{\text{diameter}}{2}$

Diameter = $2 \cdot$ radius

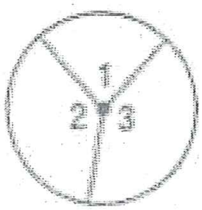
Central Angle- an angle whose sides are radii of a circle and vertex is at the center of a circle.



- The measure of an arc is EQUAL to its central angle.

  i.e. $\angle HEC = m\widehat{HC}$

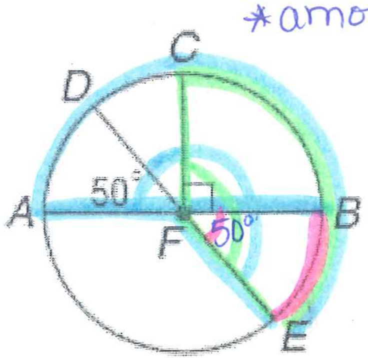
- The sum of the measures of the central angle of a circle with no interior points in common is 360°



$m<1+m<2+m<3=$ 360°

Example 2 – Arc Measure: Find the $m\widehat{BE}$, $m\widehat{CBE}$, and $m\widehat{ACE}$

*amount of degrees to form the arc



$m\widehat{BE} = \angle BFE$

$m\widehat{BE} = 50°$ (vertical <s are ≅)

$m\widehat{CBE} = \angle CFB + \angle BFE$

$m\widehat{CBE} = 90° + 50° = 140°$

half-circle (formed by diameter) is 180°

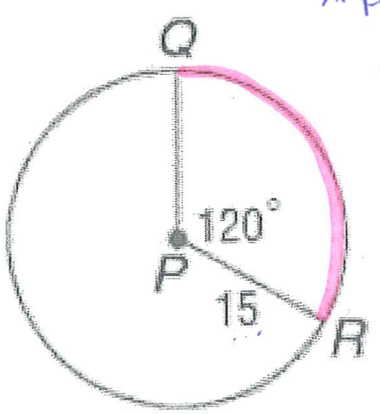
$m\widehat{ACE} = \angle AFB + \angle BFE$

$m\widehat{ACE} = 180° + 50° = 230°$

Note: We can also find the **length of an arc** by comparing an arc to the circumference of the circle.

Example 3 – Arc Length: Find length of $\widehat{QR}$ ⇒ use a proportion

part of circumference



$m\widehat{QR} = 120°$ not a length

$\frac{\text{degree of arc}}{\text{total degrees}} = \frac{\text{arc length}}{\text{circumference}}$ $C = 2\pi r$

$\frac{120°}{360°} = \frac{x}{30\pi}$

$360x = 3600\pi$

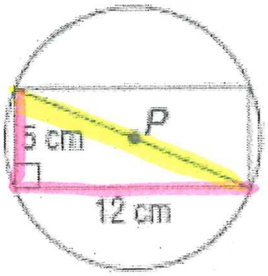
$x = 10\pi$ EXACT ≈ 31.4 APPROX.

Recall:

Circumference = $2\pi \cdot r$ or $\pi \cdot d$ (units)   Area = πr^2 (units^2)

Find the Diameter, Radius, Circumference, and Area of each circle

1.



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

$169 = d^2$

$13 = d$ cm

Radius: $r = \frac{d}{2} = \frac{13}{2}$ cm or 6.5 cm

$C = 2\pi r$

$C = 13\pi$ cm

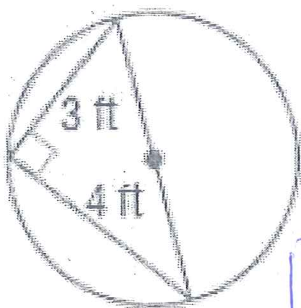
$C \approx 40.84$ cm

$A = \pi r^2$

$A = \pi (\frac{13}{2})^2$

$A = \frac{169\pi}{4}$ cm^2 ≈ 132.73 cm^2

2.



Diameter: 5 ft

radius: $\frac{5}{2}$ ft or 2.5 ft

$C = 5\pi$ ft

$C \approx 15.71$ ft

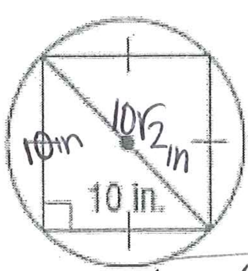
$A = \pi r^2$

$A = \pi (5/2)^2$

$A = \frac{25\pi}{4}$ ft^2

$A \approx 19.63$ ft^2

3.



Diameter: $10\sqrt{2}$ in

Radius: $5\sqrt{2}$ in

$C = \pi d$

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

$C \approx 44.43$ in

$A = \pi r^2$

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

$A = \pi (25 \cdot 2)$

$A = 50\pi$ in^2

$A \approx 157.08$ in^2

4. Find the radius and diameter when the circumference is 22π.

$C = 22\pi$

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

$2r = 22$

$r = 11$ units

$d = 22$ units