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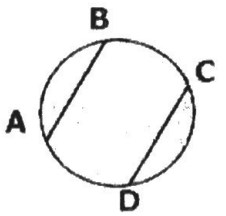
$\overset{\frown}{AB} \cong \overset{\frown}{CD}$ IFF $AB \cong DC$

7.3 Properties of Chords

Theorem: In the same circle, or in congruent circles, two minor arcs are congruent if and only if their corresponding chords are congruent.



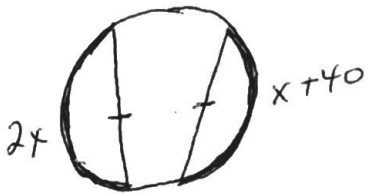
Example 1:

$x = 60$

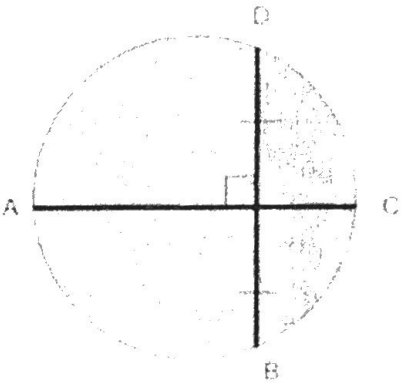
Example 2:

$2x = x + 40$

$x = 40$



What can you tell me about segment AC if you know it is the perpendicular bisectors of segments DB? It's the diameter.



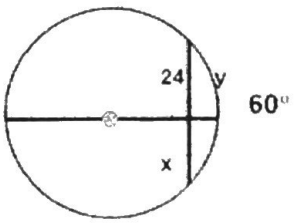
Theorem: If one chord is a perpendicular bisector of another chord, then the first chord is a diameter.

Theorem: If a diameter of a circle is perpendicular to a chord, then the diameter bisects the chord and its arc.

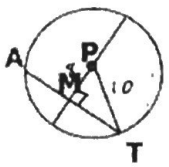
Example:

Solve for x and y.

$x = 24$ $y = 30°$



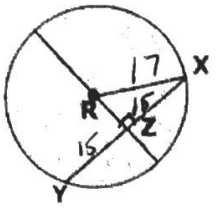
Example: In $\odot P$, if $PM \perp AT$, $PT = 10$ and $PM = 8$, find AT



$8^2 + x^2 = 10^2$

$x = 6$. $AT = 12$

Example: In $\odot R$, $XY=30$, $RX=17$, and $RZ \perp XY$. Find RZ

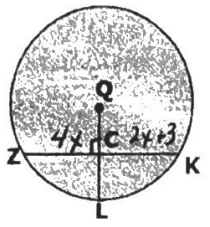


$x^2+15^2=17$

$RZ = 8$

Example: In $\odot Q$, $\overset{\frown}{KL} \cong \overset{\frown}{LZ}$

If $CK = 2x+3$ and $CZ = 4x$, find x.

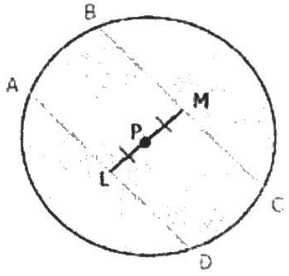


$4x = 2x+3$

$2x = 3$

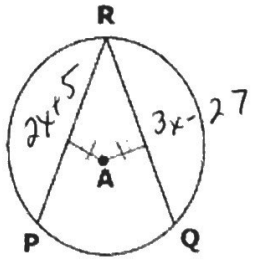
$x = 3/2$ or 1.5

Theorem: In the same circle or in congruent circles, two chords are congruent if and only if they are equidistant from the center.



$AD \cong BC$ IFF $LP \cong PM$

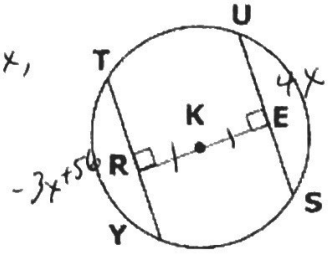
Example: In $\odot A$, $PR = 2x+5$, and $QR = 3x-27$. Find x.



$2x+5 = 3x-27$

$x = 32$

Example: In $\odot K$, K is the midpoint of RE. If $TY = -3x+56$ and $US = 4x$, find x.



$-3x+56 = 4x$

$56 = 7x$

$8 = x$