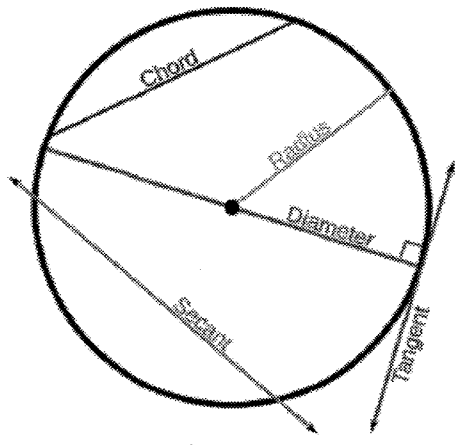
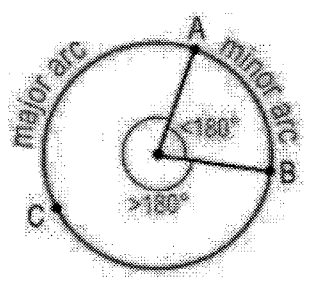
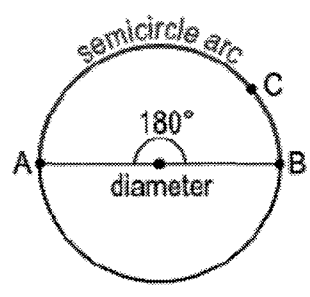


LESSON #1: CENTRAL AND INSCRIBED ANGLES

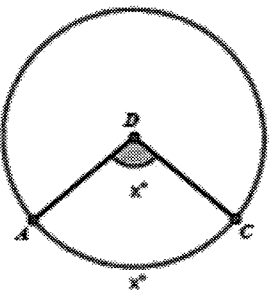


1. circle - is a shape with all points the same distance from the center.
2. diameter - is a *chord* that passes through the center of the circle.
3. radius - A line segment that joins the center of a circle with any point on its circumference.
4. chord - A line segment whose endpoints both lie on the circle.
5. Tangent - A line segment or line that touches the circle at one point.
6. secant - A line extension of a chord that touches a circle at two points.

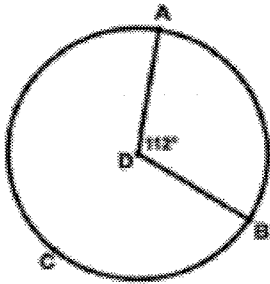


7. semi-circle - half of a circle; the arc from one end of a diameter to the other.
8. arc - A portion of the circle. circumference
9. major arc - An arc that measure more than 180° .
10. minor arc - An arc that measures less than 180° .

WHAT IS THE RELATIONSHIP BETWEEN CENTRAL ANGLES AND ITS INTERCEPTED ARC?!!??

Central Angles of Circles	Diagram	Measure of angle
A central angle of a circle is any angle whose vertex is the <u>center</u> of the circle.		The measure of the central angle is <u>equal</u> to the intercepted arc angle. measure Central Angle <u>EQUAL</u> Arc Ratio: <u>1:1</u>

11. In the diagram of circle D shown below, $m\angle ADB = 112^\circ$.

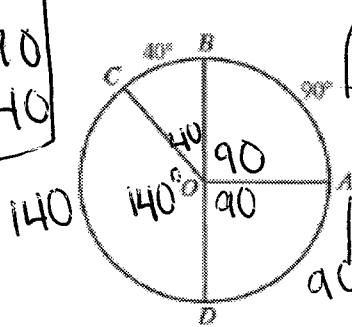


(a) What is $m\widehat{AB}$?
 112°

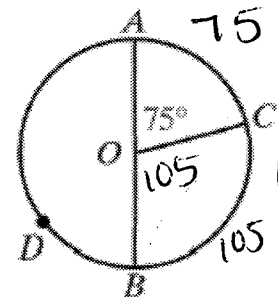
(b) What is $m\widehat{ACB}$?
 $360 - 112 = \underline{248^\circ}$

12. Identify each missing central angle and each missing intercepted arc.

$\widehat{AD} = 90$
 $\widehat{CB} = 140$

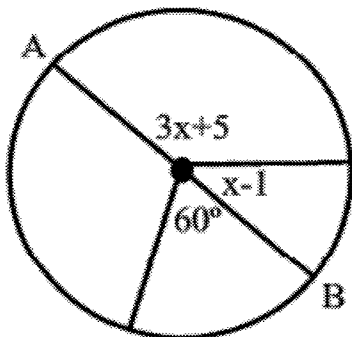


$\angle AOB = 90^\circ$
 \hookrightarrow diameter = 180°
 $180 - 90 = 90^\circ$
 $\angle COD = 360 - (40 + 90 + 90) = 140^\circ$



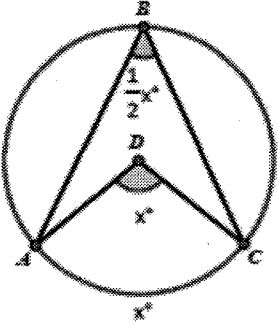
$\widehat{AC} = 75$
 $\angle COB = 180 - 75 = 105$
 $\widehat{CB} = 105$
 $\angle AOB = 180^\circ$
 $\widehat{ADB} = 180^\circ$

13. Given the labeled diagram below, with diameter \overline{AB} . Find x.



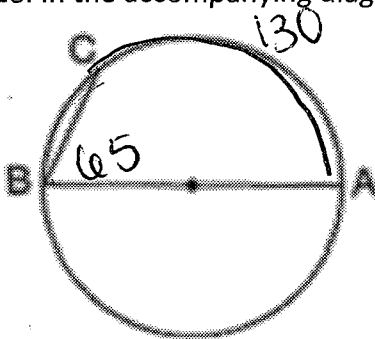
$3x + 5 + x - 1 = 180$
 $4x + 4 = 180$
 $4x = 176$
 $x = 44$

WHAT IS THE RELATIONSHIP BETWEEN INSCRIBED ANGLES AND ITS INTERCEPTED ARC?!?!?

Inscribed Angles of Circles	Diagram	Measure of angle
<p>An inscribed angle of a circle is any angle whose vertex is <u>ON</u> the circle.</p>		<p>The measure of the inscribed angle is <u>Half</u> of the intercepted arc angle.</p> <p>Inscribed Angle <u>1/2</u> Arc</p> <p>Ratio: <u>1:2</u></p>

<p>16. In the accompanying diagram of circle O, the measure of \widehat{RS} is 64°. What is $m\angle RTS$?</p> <p>$64 \div 2 = 32$</p> <p>$\angle RTS = 32^\circ$</p>	<p>17. In the accompanying diagram of circle O, the measure of $\angle KLM$ is 38°. What is the number of degrees in the measure of \widehat{KM}?</p> <p>$38 \times 2 = 76$</p> <p>$\widehat{KM} = 76^\circ$</p>
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18. In the accompanying diagram, \widehat{BA} is a diameter and $m\angle CBA = 65^\circ$. Determine the $m\widehat{BC}$.

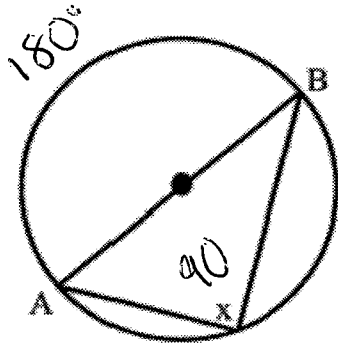


$$\widehat{BCA} = 180^\circ$$

$$\widehat{CA} = 65 \times 2 = 130$$

$$180 - 130 = \boxed{50^\circ = \widehat{BC}}$$

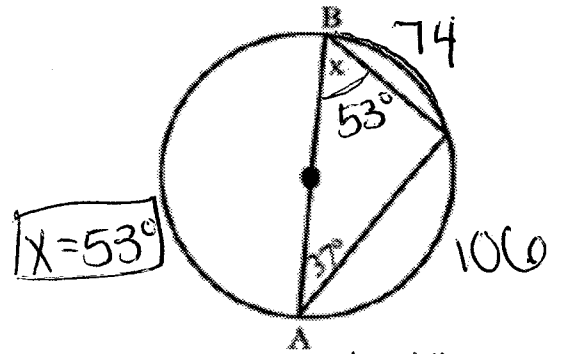
19. Given diameter \overline{AB} Find x .



$$180 \div 2 = 90$$

$$\boxed{x = 90^\circ}$$

20. Given diameter \overline{AB} Find x .

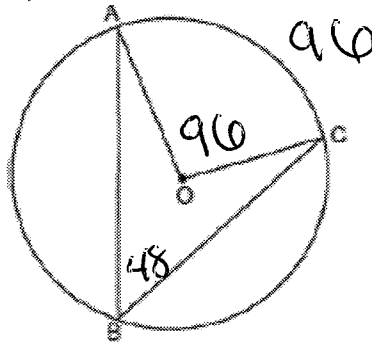


$$\boxed{x = 53^\circ}$$

$$180 - 74 = 106$$

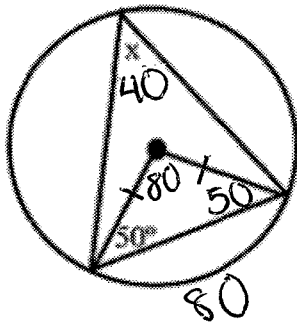
$$106 \div 2 = 53^\circ$$

21. In the accompanying diagram of circle O, \overline{AB} and \overline{BC} are chords and $m\angle AOC = 96^\circ$. What is $m\angle ABC$?



$$96 \div 2 = \boxed{48^\circ = \angle ABC}$$

22. Given circle with center indicated. Find x .

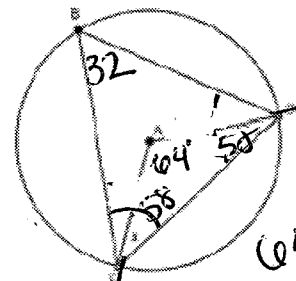


$$180 - (50 + 50) = 80$$

$$80 \div 2 = 40^\circ$$

$$\boxed{x = 40^\circ}$$

23. Given: $m\angle B = 32^\circ$, what is the value of x ?



$$180 - 64 = 116$$

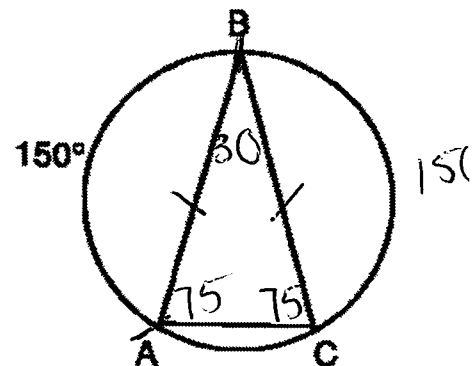
$$\frac{116}{2} = 58$$

$$64 \quad \boxed{x = 58^\circ}$$

24. What is the measure of $\angle ABC$ if triangle ABC is isosceles?

$$180 - (75 + 75)$$

$$\boxed{\angle ABC = 30^\circ}$$

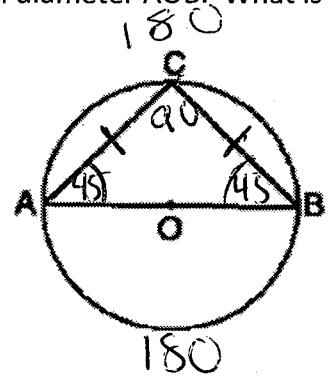


25. In the accompanying diagram, isosceles triangle ABC is inscribed in circle O with diameter AOB . What is the measure of $\angle CAB$?

$$180 \div 2 = 90$$

$$180 - 90 \div 2 = 45^\circ$$

$$\boxed{\angle CAB = 45^\circ}$$



26.

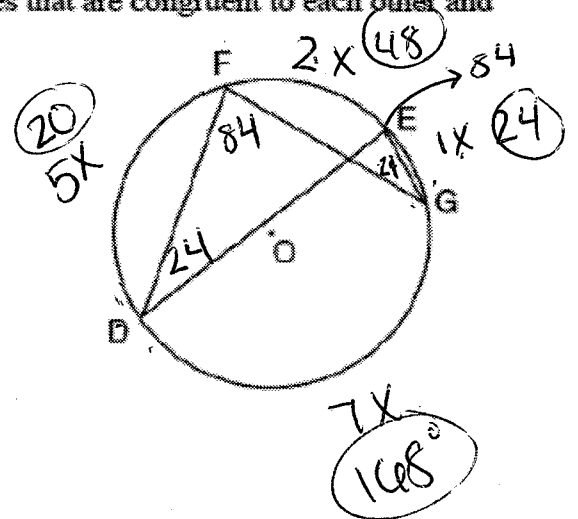
In the diagram below of circle O , chords \overline{DF} , \overline{DE} , \overline{FG} , and \overline{EG} are drawn such that $m\widehat{DF} : m\widehat{FE} : m\widehat{EG} : m\widehat{GD} = 5 : 2 : 1 : 7$. Identify one pair of inscribed angles that are congruent to each other and give their measure.

$$5x + 2x + 1x + 7x = 360$$

$$\frac{15x}{15} = \frac{360}{15}$$

$$\boxed{x = 24^\circ}$$

$$\boxed{\begin{array}{l} \angle FDE \cong \angle FGE \\ \text{OR} \\ \angle DFG \cong \angle GED \end{array}}$$



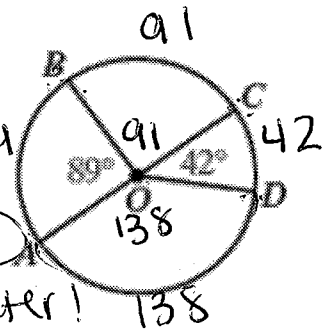
Inscribed \angle 's that intercept the same arc are \cong .

MIXED PRACTICE

1. the endpoints of \overline{AOC} are on circle O , $m\angle AOB = 89$, and $m\angle COD = 42$. Find each measure.

$m\angle BOC = 91^\circ$
 $m\widehat{BC} = 91^\circ$
 $m\widehat{DA} = 138^\circ$
 $m\widehat{BCD} = 91 + 42 = 133$
 $m\angle AOC = 180^\circ$ diameter!

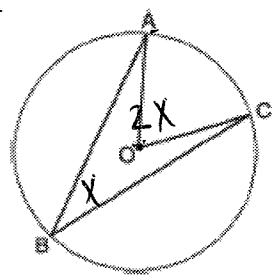
$m\widehat{AB} = 89^\circ$
 $m\angle DOA = 138^\circ$
 $m\angle BOD = 91 + 42 = 84$
 $m\widehat{DAB} = 138 + 84 = 227^\circ$
 $m\widehat{ADC} = 180^\circ$ diameter!



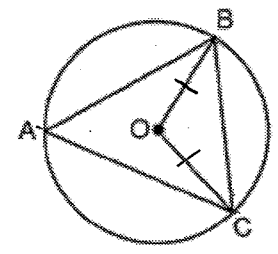
2. Circle O with $\angle AOC$ and $\angle ABC$ is shown in the diagram below. What is the ratio of $m\angle AOC$ to $m\angle ABC$?

3. In the diagram below of circle O , \overline{OB} and \overline{OC} are radii, and chords \overline{AB} , \overline{BC} , and \overline{AC} are drawn. Which statement must always be true?

- $\angle X$ X
~~1) 1:1~~
 2) 2:1
~~3) 3:1~~
~~4) 1:2~~

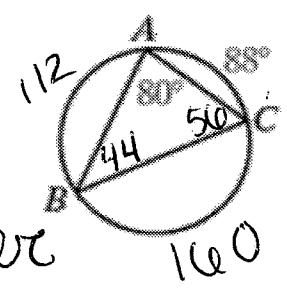


- ~~1) $\angle BAC \cong \angle BOC$~~
 2) $m\angle BAC = \frac{1}{2} m\angle BOC$
~~3) $\triangle BAC$ and $\triangle BOC$ are isosceles.~~
~~4) The area of $\triangle BAC$ is twice the area of $\triangle BOC$.~~



4. Triangle ABC is inscribed in a circle, $m\angle A = 80$ and $m\widehat{AC} = 88$. Find:

- a. $m\widehat{BC} = 160^\circ$ (80 x 2)
 b. $m\angle B = 44^\circ$ (88 ÷ 2)
 c. $m\angle C = 56^\circ$ (180 - (80 + 44))
 d. $m\widehat{AB} = 112^\circ$ (56 x 2)
 e. $m\widehat{BAC} = 180^\circ$ diameter



5. Triangle DEF is inscribed in a circle, $\overline{DE} \cong \overline{EF}$, and $m\angle F = 100$. Find:

- a. $m\angle D = 50^\circ$ (100 ÷ 2)
 b. $m\widehat{DE} = 130^\circ$ (65 x 2)
 c. $m\angle E = 65^\circ$ (180 - 50) / 2
 d. $m\angle F = 100^\circ$
 e. $m\widehat{DF} = 130^\circ$ (65 x 2)

