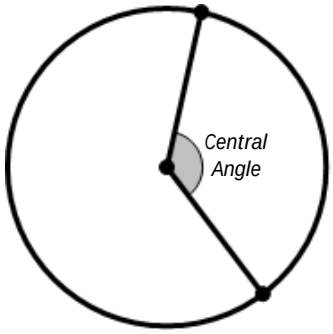
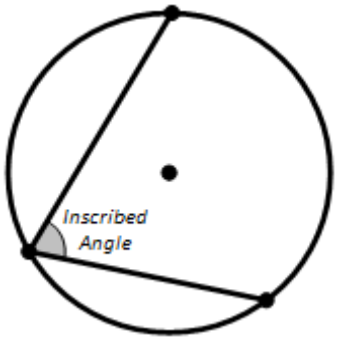
Sec 4.2 – Circles & Volume
Inscribed Angles

Name:

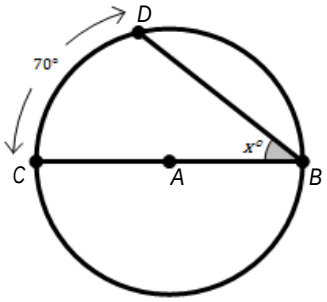
Central Angle: An angle whose vertex is the center of the circle.



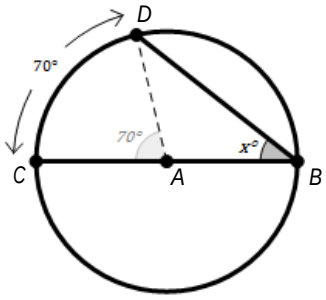
Inscribed Angle: An angle whose vertex is on a circle and whose sides contain chords of the circle



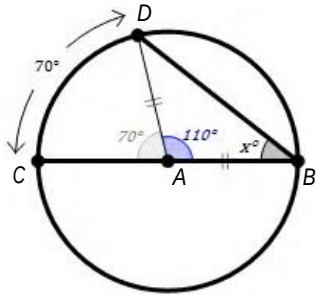
Inscribed Angle Properties: Consider the following diagram an inscribed angle of the circle center at A.



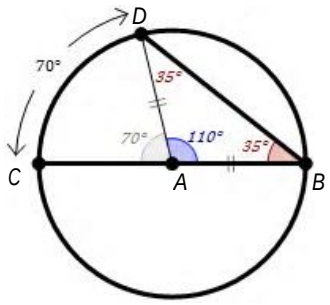
Consider the inscribed angle $\measuredangle CBD$ which intercepts arc $\overset{\frown}{DC}$ that measures 70°.



Since the central angle $\measuredangle CAD$ intercepts arc $\overset{\frown}{DC}$ then $m\measuredangle CAD$ = 70°.



Triangle ΔDAB is isosceles because the legs are radii of the circle. The measure of angle $m\measuredangle DAB$ = 110° since it forms a linear pair with $\measuredangle CAD$.



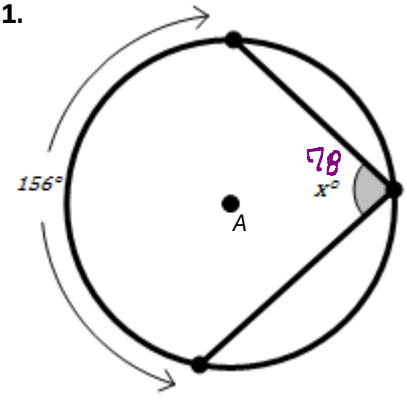
The based angles of ΔDAB must be congruent and the interior angles of triangle must sum to 180°. So, 110 + x + x = 180

In a similar fashion using addition or subtraction, it can be shown this idea extends to any inscribed angle.

"An inscribed angle's measure is exactly half of the arc measure that it intercepts."

Find the most appropriate value for 'x' in each of the diagrams below. (Assume point 'A' is the center of the circle.)

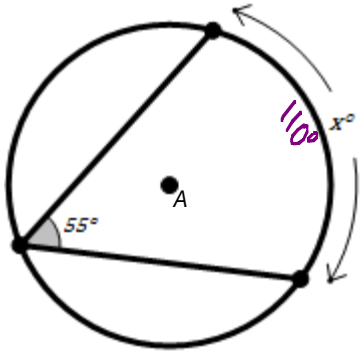
1.



$X = \frac{156}{2} = 78°$

x =

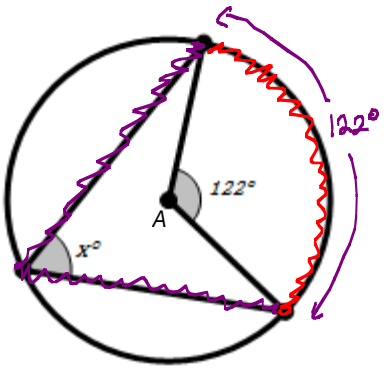
2.



$\frac{X}{2} = 55$ $\quad 2(55) = X$

x = 110°

3.

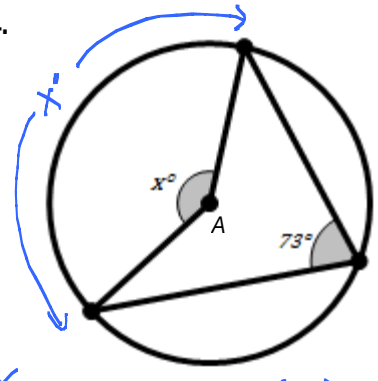


$X = \frac{122}{2} = 61$

x = 61°

Find the most appropriate value for 'x' in each of the diagrams below. (Assume point 'A' is the center of the circle.)

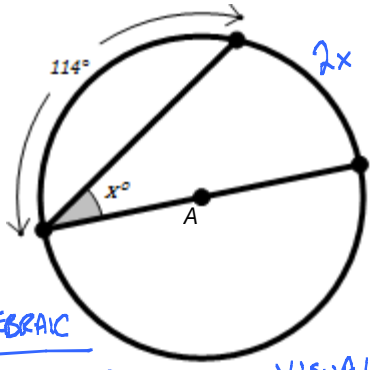
4.



$\frac{x}{2} = 73$ OR $2(73) = x$

$x = 146°$

5.



ALGEBRAIC

$114 + 2x = 180$

$-114 \quad -114$

$\frac{2x}{2} = \frac{66}{2}$

$x = 33$

VISUAL

STEP #1:

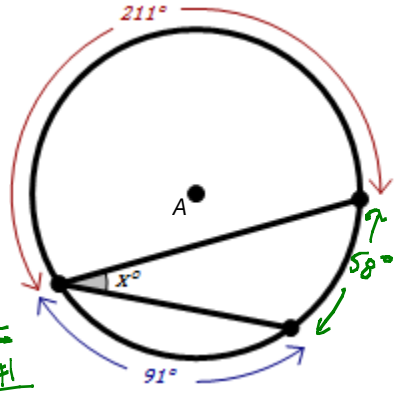
$180 - 114 = 66$

STEP #2

$x = \frac{66}{2}$

$x = 33°$

6.



VISUAL

STEP #1

$360 - 211 - 91 = 58°$

STEP #2

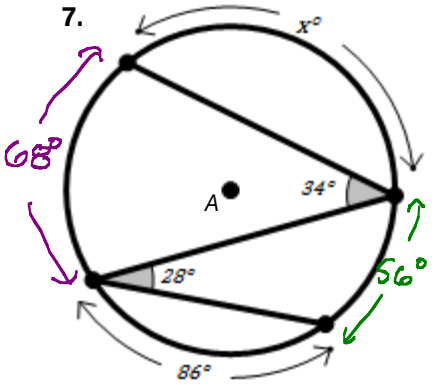
$x = \frac{58}{2} = 29°$

OR ALGEBRA

$91 + 211 + 2x = 360$

$x = 29°$

7.



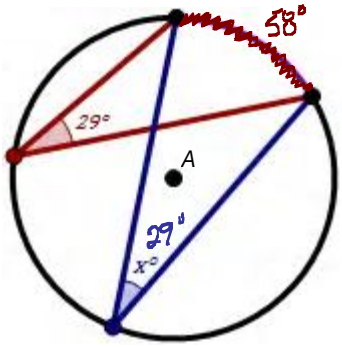
$x + 68 + 86 + 56 = 360$

$x + 210 = 360$

$-210 \quad -210$

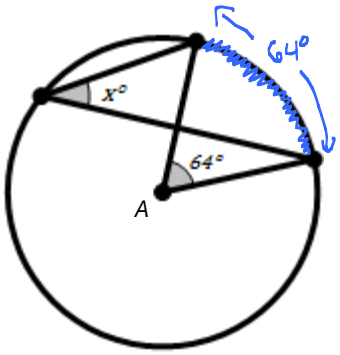
$x = 150°$

8.



$x = 29°$

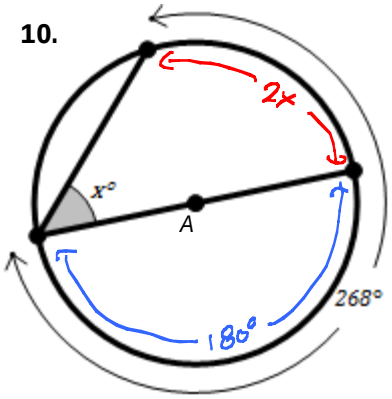
9.



$x = \frac{64}{2} = 32°$

$x = 32°$

10.



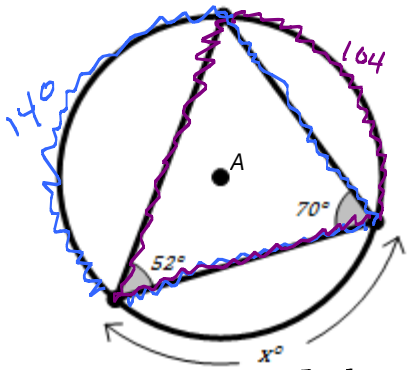
$2x + 180 = 268$

$-180 \quad -180$

$\frac{2x}{2} = \frac{88}{2}$

$x = 44°$

11.



$140 + 104 + x = 360$

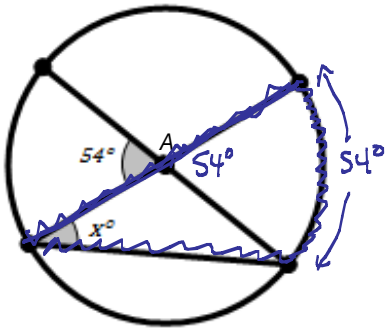
$244 + x = 360$

$-244 \quad -244$

$x = 116$

$x = 116°$

12.

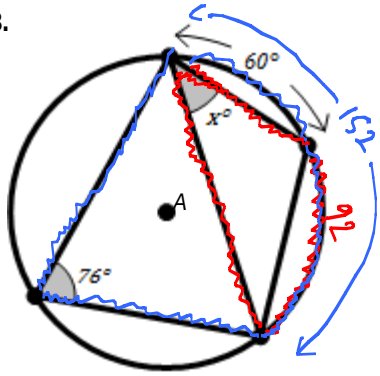


$x = \frac{54}{2} = 27°$

$x = 27°$

Find the most appropriate value for 'x' in each of the diagrams below. (Assume point 'A' is the center of the circle.)

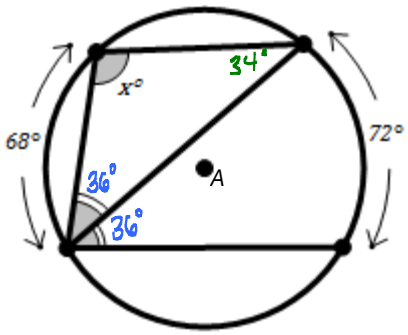
13.



$x = \frac{92^\circ}{2} = 46^\circ$

$x = 46^\circ$

14.



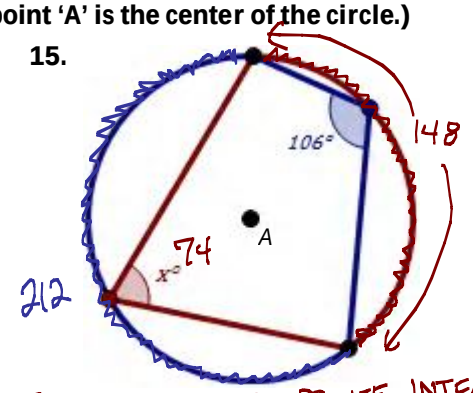
$x + 36 + 34 = 180$

$x + 70 = 180$

$-70 \quad -70$

$x = 110^\circ$

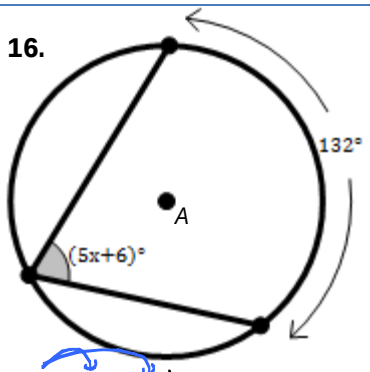
15.



THE SUM OF THE OPPOSITE INTERIOR ANGLES OF A QUADRILATERAL INSCRIBED IN A CIRCLE WILL ALWAYS BE 180°.

$x = 74$

16.



$2(5x+6) = 132$

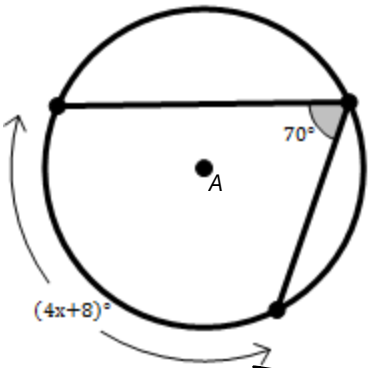
$10x + 12 = 132$

$-12 \quad -12$

$\frac{10x}{10} = \frac{120}{10}$

$x = 12$

17.



$4x + 8 = 70 \cdot 2$

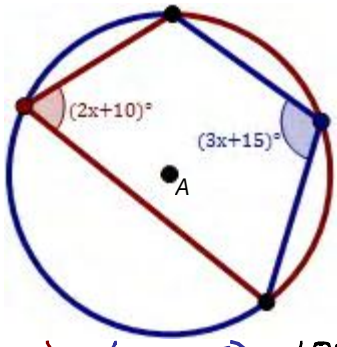
$4x + 8 = 140$

$-8 \quad -8$

$\frac{4x}{4} = \frac{132}{4}$

$x = 33$

18.



$(2x+10) + (3x+15) = 180$

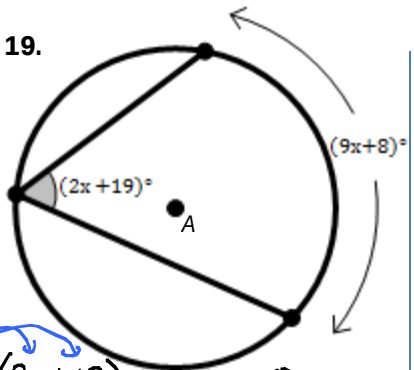
$5x + 25 = 180$

$-25 \quad -25$

$\frac{5x}{5} = \frac{155}{5}$

$x = 31$

19.



$2(2x+19) = 9x+8$

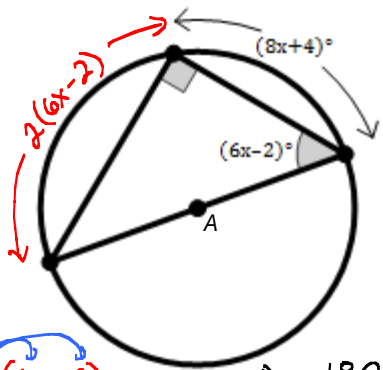
$4x + 38 = 9x + 8$

$-4x \quad -8 \quad -4x \quad -8$

$\frac{30}{5} = \frac{5x}{5}$

$x = 6$

20.



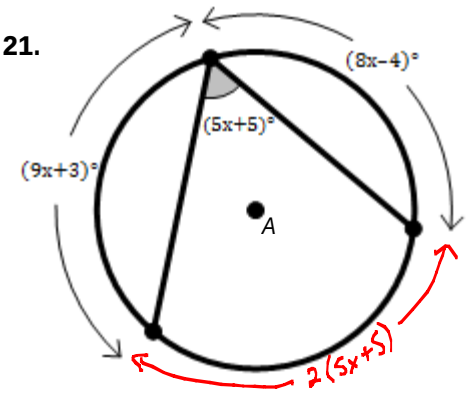
$2(6x-2) + (8x+4) = 180$

$12x - 4 + 8x + 4 = 180$

$\frac{20x}{20} = \frac{180}{20}$

$x = 9$

21.



$(9x+3) + 2(5x+5) + (8x-4) = 360$

$27x + 9 = 360$

$-9 \quad -9$

$27x = 351$

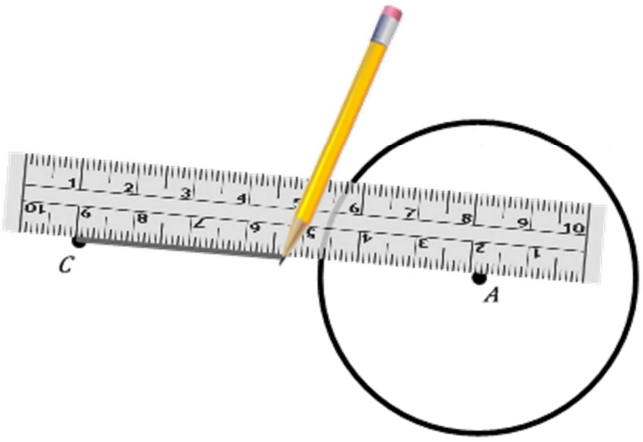
$x = 13$

$\frac{27x}{27} = \frac{351}{27}$

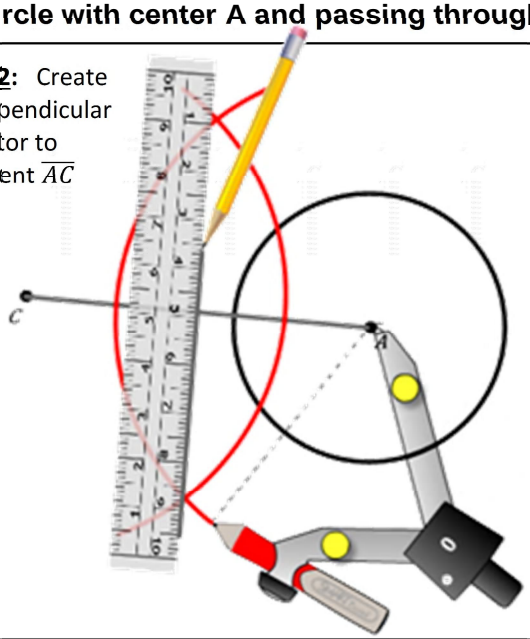
$x = 13$

[Creating a Tangent To a Circle] Construct a line tangent to circle with center A and passing through point C.

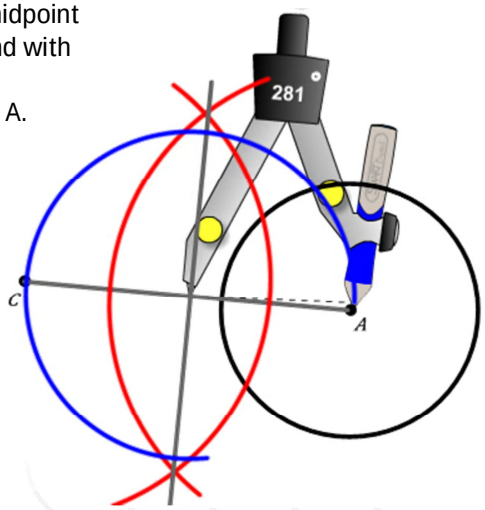
Step I: First draw a segment with end points A & C.



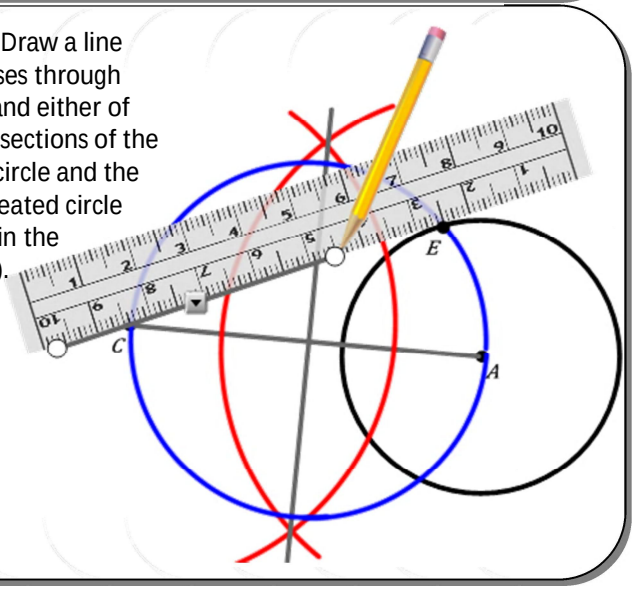
Step 2: Create a perpendicular bisector to segment $\overline{AC}$



Step 3: Create a circle centered at the midpoint of segment $\overline{AC}$ and with a radius from the midpoint to point A.



Step 4: Draw a line that passes through point C and either of the intersections of the original circle and the newly created circle (point E in the diagram).



Construct a tangent line to circle with center A that passes through point C.