

# SOL 7.1

May 16, 2016 11:27 AM

Name: Jerry Zheng

Date: \_\_\_\_\_

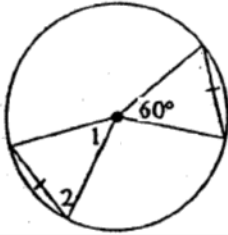
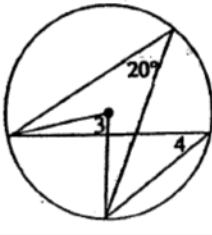
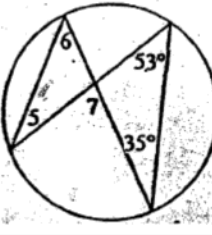
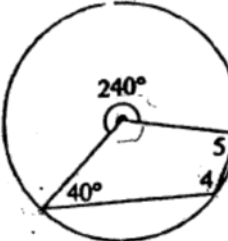

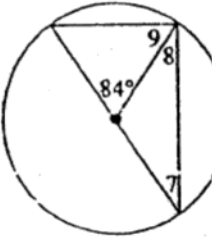
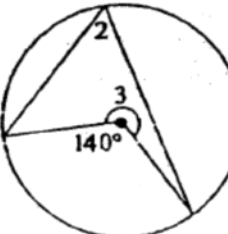
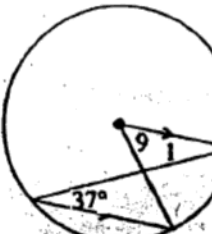
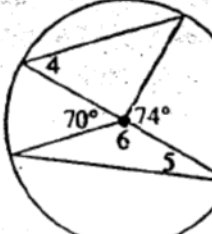
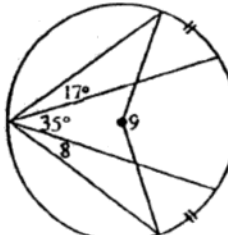
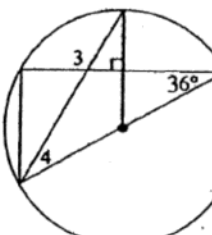
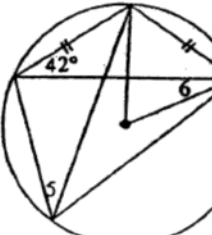
## Math 9 Enriched: Circle Geometry Assignment 7.1 - Central angle and Inscribed Angles

Property 1: An inscribed Angle of a chord is equal to half of the Central Angle by that same/equal chord

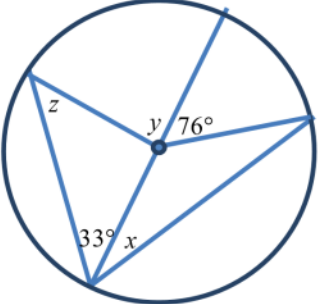
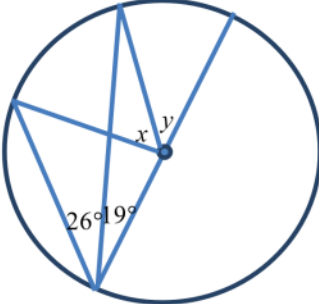
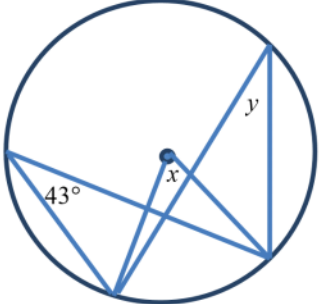
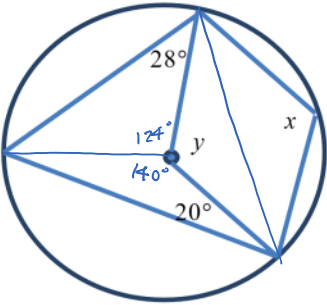
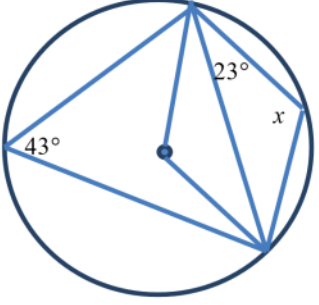
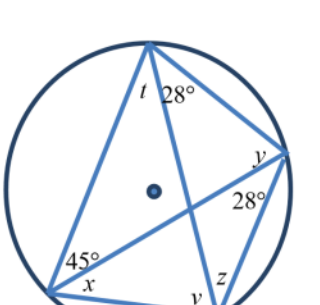
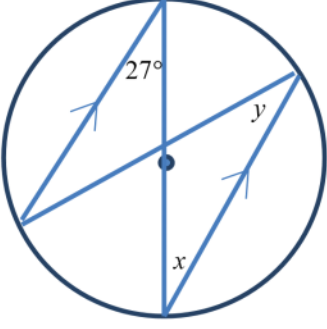
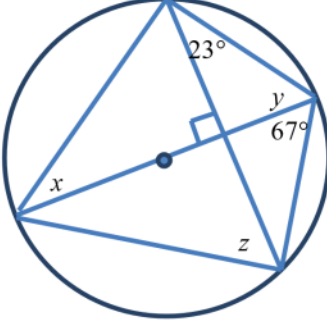
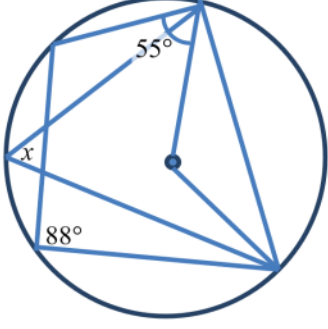
Property 2: Angles inscribed by the diameter are 90 degrees. Angles inscribed by a semicircle are 90degrees.

Property 3: All inscribed angles by the same/equal chords are equal (Rabbit ears)

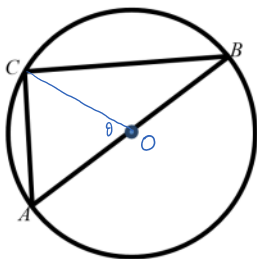
1. Find the value of the missing angles

<p>i) <math>\angle 1 = 60^\circ</math> <math>\angle 2 = 60^\circ</math></p> 	<p>ii) <math>\angle 3 = 40^\circ</math> <math>\angle 4 = 20^\circ</math></p> 	<p>iii) <math>\angle 5 = 35^\circ</math> <math>\angle 6 = 53^\circ</math> <math>\angle 7 = 92^\circ</math></p> 
<p>iv) <math>\angle 4 = 120^\circ</math> <math>\angle 5 = 80^\circ</math></p> 	<p>v) <math>\angle 6 = 80^\circ</math> <math>\angle 7 = 280^\circ</math> <math>\angle 8 = 140^\circ</math></p> 	<p>vi) <math>\angle 7 = 42^\circ</math> <math>\angle 8 = 42^\circ</math> <math>\angle 9 = 48^\circ</math></p> 
<p>vii) <math>\angle 2 = 70^\circ</math> <math>\angle 3 = 220^\circ</math></p> 	<p>viii) <math>\angle 1 = 37^\circ</math> <math>\angle 9 = 74^\circ</math></p> 	<p>ix) <math>\angle 4 = 37^\circ</math> <math>\angle 5 = 35^\circ</math> <math>\angle 6 = 110^\circ</math></p> 
<p>x) <math>\angle 8 = 17^\circ</math> <math>\angle 9 = 138^\circ</math></p> 	<p>xi) <math>\angle 3 = 117^\circ</math> <math>\angle 4 = 27^\circ</math></p> 	<p>xii) <math>\angle 5 = 42^\circ</math> <math>\angle 6 = 6^\circ</math></p> 

2. Find the value of each of the following angles:

<p>i) <math>\angle x = 38^\circ</math> <math>\angle y = 66^\circ</math> <math>\angle z = 33^\circ</math></p> 	<p>ii) <math>\angle x = 52^\circ</math> <math>\angle y = 38^\circ</math></p> 	<p>iii) <math>\angle x = 86^\circ</math> <math>\angle y = 43^\circ</math></p> 
<p>iv) <math>\angle x = 142^\circ</math> <math>\angle y = 96^\circ</math></p> 	<p>v) <math>\angle x = 137^\circ</math></p> 	<p>vi) <math>\angle x = 28^\circ</math> <math>\angle y = 45^\circ</math> <math>\angle z = 45^\circ</math>  <math>\angle t = 28^\circ</math> <math>\angle v = 45^\circ</math></p> 
<p>vii) <math>\angle x = 27^\circ</math> <math>\angle y = 27^\circ</math></p> 	<p>viii) <math>\angle x = 23^\circ</math> <math>\angle y = 67^\circ</math> <math>\angle z = 67^\circ</math></p> 	<p>ix) <math>\angle x = 53^\circ</math></p> 

3. Given that the line segment AB is a diameter, prove that angle ACB is 90 degree

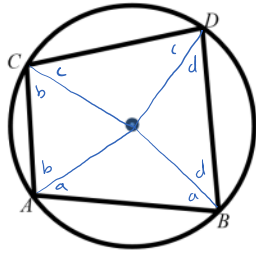


$$\angle OCA = 90^\circ - \frac{\theta}{2}$$

$$\angle OCB = \frac{\theta}{2}$$

$$\angle ACB = 90^\circ$$

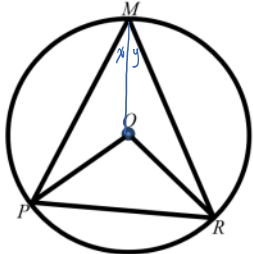
4. With all four vertices A, B, C, and D on the circumference, prove that the opposite angles A and D are supplementary and also angles B and C are supplementary.



$$2a + 2b + 2c + 2d = 360^\circ$$

$$a + b + c + d = 180^\circ$$

5. Given that angle POR is a central angle and angle PMR is an inscribed angle by chord PR, prove that angle POR is twice angle PMR.

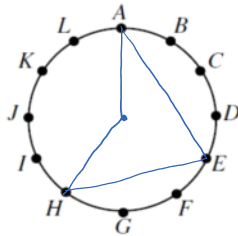


$$\angle MOP = 180 - 2x$$

$$\angle MOR = 180 - 2y$$

$$\angle POR = 2(x+y)$$

6. Given the following diagram, where all the points from A to L are equally spaced along the circumference, what is the degree angle of  $\angle AEH$ ?

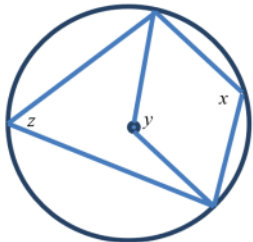


$$\angle \widehat{AH} = \frac{5}{12} \times 360^\circ$$

$$= 150^\circ$$

$$\angle AEH = 75^\circ$$

7. If the angle y is 58 degrees more than angle z, what is the value of angle "x"?

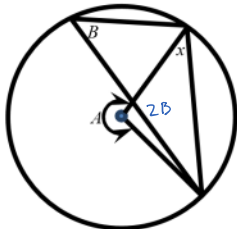


$$y + 58 = z \quad \therefore y = 116^\circ$$

$$x = \frac{360 - 116}{2}$$

$$x = 122^\circ$$

8. Given that angle A is 198 degrees more than angle B, what is the degree of angle "x"?



$$360^\circ - 2B = B + 198^\circ$$

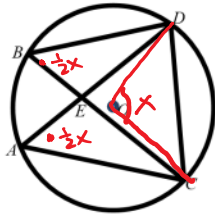
$$3B = 162^\circ$$

$$B = 54^\circ$$

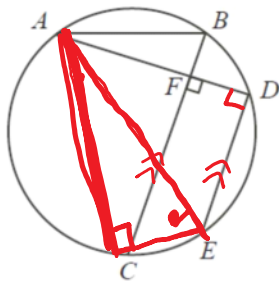
$$2B = 108^\circ$$

$$x = 36^\circ$$

9. Given that O is the center of the circle and that both angles CAD and angles CBD are inscribed by chord DC, prove that the angles are equal.



10. In the diagram, AB and BC are chords of the circle with  $AB < BC$ . If D is the point on the circle such that AD is perpendicular to BC and E is the point on the circle such that DE is parallel to BC, carefully prove, explaining all steps, that  $\angle EAC + \angle ABC = 90^\circ$

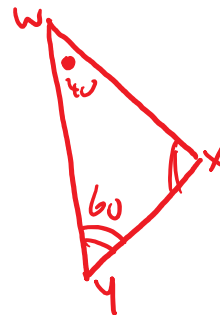
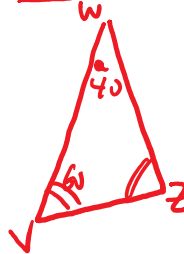
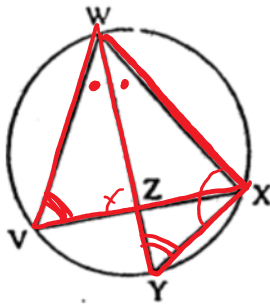


$$\angle EAC + \angle AEC = 90^\circ$$

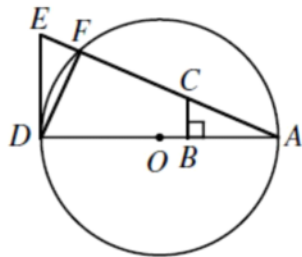
$$\angle ABC = \angle AEC \quad \text{RABBIT EARS.}$$

$$\underline{\underline{\angle EAC + \angle ABC = 90^\circ}}$$

11. In the diagram, it is given that chord WY bisects angle VWX, prove that angle VZW is equal to angle WXY



12. In the diagram shown,  $\angle ABC = 90^\circ$ ,  $CB \parallel ED$ ,  $AB = DF$ ,  $AD = 24$ ,  $AE = 25$  and O is the center of the circle. Determine the perimeter of CBDF.



$$CB \parallel ED \therefore ED \perp AD$$

$$AD \text{ is diameter, } \angle AFD = 90^\circ$$

$$\triangle AFD \sim \triangle ADE \text{ by AAA: } ED = 7 \text{ by Pythagorean}$$

$$\frac{AD}{AE} = \frac{DF}{DE}; DF = \frac{168}{25}, AB = \frac{168}{25}$$

$$\triangle ABC \sim \triangle ADE \text{ by AAA}$$

$$\frac{AB}{AD} = \frac{CB}{ED} = \frac{AC}{EA}; AC = 7; CB = \frac{49}{25}$$

$$EC = 18; DB = \frac{432}{25}$$

$$\text{Perimeter} = \frac{1106}{25}$$