

Unit 05 - Section 03

Key

In Exercises 3-6, find the sum of the measures of the interior angles of the indicated convex polygon.  
(See Example 1.)

In Exercises 7-10, the sum of the measures of the interior angles of a convex polygon is given. Classify the polygon by the number of sides. (See Example 2.)

5. 16-gon

6. 20-gon

9. 2520°

10. 3240°

$$180(16-2)$$

$$180(20-2)$$

$$180(n-2) = 2520$$

$$180(n-2) = 3240$$

$$\text{sum} = 2520^\circ$$

$$\text{sum} = 3240$$

$$n = 16$$

16-gon

$$\frac{180}{180} \frac{3240}{180}$$

$$n-2 = 18$$

$$+2 +2$$

$$n = 20$$

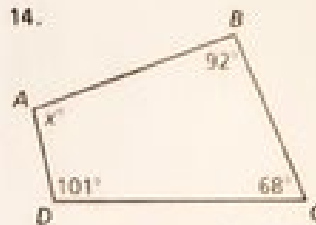
20-gon

In Exercises 11-14, find the value of  $x$ . (See Example 3.)



$$x + 154 + 88 + 29 = 360$$

$$x = 89$$



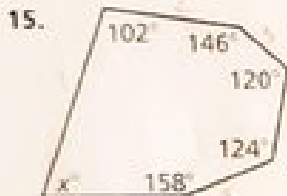
$$x + 92 + 68 + 101 = 360$$

$$x + 261 = 360$$

$$-261 \quad -261$$

$$x = 99^\circ$$

In Exercises 15-18, find the value of  $x$ .



$$x + 102 + 146 + 120 + 124 + 158 = 720$$

$$x = 70^\circ$$



$$x + 86 + 140 + 138 + 59 = 540$$

$$x = 117^\circ$$

In Exercises 19-22, find the measures of  $\angle X$  and  $\angle Y$ .

20.



$$w + w + 90 + 119 + 47 = 540$$

$$2w + 256 = 540$$

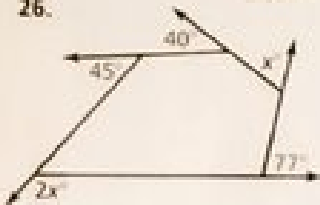
$$2w = 284$$

$$w = 142^\circ$$

$$m\angle X = 142^\circ = m\angle Y$$

In Exercises 23–26, find the value of  $x$ . (See Example 5.)

26.



exterior angles = all to 360

$$x + 40 + 45 + 2x + 77 = 360$$

$$3x + 162 = 360$$

$$x = 66$$

In Exercises 27–30, find the measure of each interior angle and each exterior angle of the indicated regular polygon. (See Example 6.)

27. Heptagon

each Ext

$$81.43^\circ$$

Each Int

$$128.57^\circ$$

28. 18-gon

each Ext

$$20^\circ$$

Each Int

$$160$$

Challenge:

How many regular polygons have an exterior angle measure between  $4^\circ$  and  $5^\circ$ ?

$$\frac{360}{n} = 4$$

$$\frac{360}{n} = 5$$

34. MODELING WITH MATHEMATICS The floor of the gazebo shown is shaped like a regular decagon. Find the measure of each interior angle of the regular decagon. Then find the measure of each exterior angle.



Each Exterior Angles

$$\frac{360}{10} = 36^\circ$$

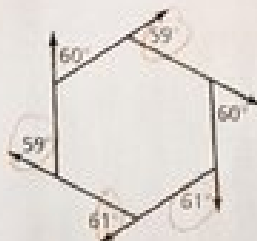
Each Interior Angle

$$180 - 36 = 144^\circ$$

$$n = 90 \text{ Sides} \quad n = 72 \text{ Sides}$$

19 regular polygons have exterior angles between  $4^\circ$  and  $5^\circ$

50. HOW DO YOU SEE IT? Is the hexagon a regular hexagon? Explain your reasoning.  $n=6$

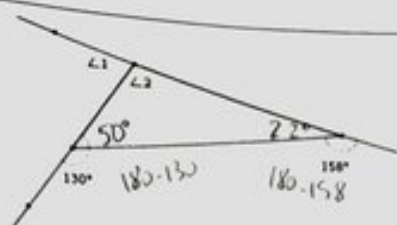


All Interior Angles = measure all Exterior Angles =

The exterior angles are not all equal

$$n = \frac{360}{6} = 60^\circ$$

So, it's Not a regular hexagon, not all ext. angles are  $= 60^\circ$



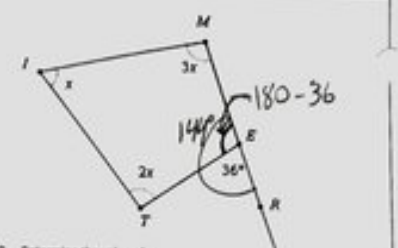
17. Which of the numbered angles (1 or 2) is an exterior angle?  
 $\angle 1$

18. Which of the numbered angles is an interior angle (1 or 2)?  
 $\angle 2$

19. Determine the measure of angle 1 using two different methods

Method 1  
 $130 + 158 + m\angle 1 = 360$   
 $m\angle 1 = 72^\circ$

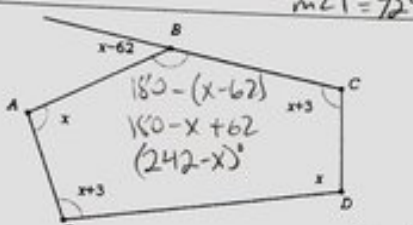
Method 2  
 $180 = 50 + 22 + m\angle 2$   
 $m\angle 2 = 108$   
 $180 = 108 + m\angle 1$   
 $m\angle 1 = 72^\circ$



20. Determine the value of x  
 $x + 2x + 3x + 144 = 360$   
 $x = 36$

21. Determine the measures of the angles

Angle T  $72^\circ$   
 Angle I  $36^\circ$   
 Angle M  $108^\circ$   
 Angle TEM  $144^\circ$

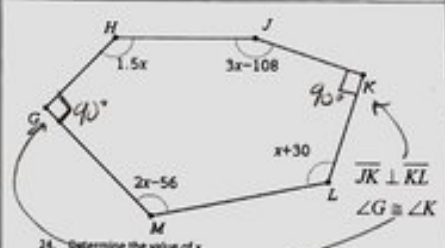


22. Determine the value of x 5 sides

$x + x + 3 + x + x + 3 + 242 - x = 540$   
 $3x + 248 = 540$   
 $x = 97.\bar{3}$

23. Determine the measures of the angles

angle A  $97.33^\circ$   
 angle ABC  $144.67 = 242 - (97.3)$   
 angle C  $100.33^\circ$   
 angle D  $97.33^\circ$   
 angle E  $100.33^\circ$



24. Determine the value of x

$1.5x + 3x - 108 + 90 + x + 30 + 2x - 56 + 90 = 720$   
 $x = 89.87^\circ$

25. Determine the measures of the angles

angle G  $90^\circ$   
 angle H  $134.81^\circ$   
 angle I  $161.61$   
 angle K  $90^\circ$   
 angle L  $119.87^\circ$   
 angle M  $123.74^\circ$

## Attachments

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quad.wmv

pentagon.wmv

hexagon.wmv

heptagon.wmv