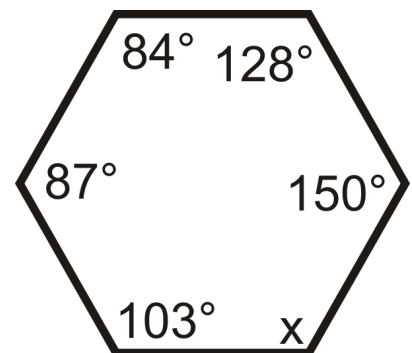


Angle Relationships in Polygons

- The sum of the exterior angles of a convex polygon is 360° .
- For a polygon with n sides, the sum of the interior angles, in degrees, is $180(n - 2)$.

Shape	Number of Sides	Sum of Interior Angles	Average Value of Interior Angle
Triangle	3	$180(n - 2) =$	
Quadrilateral		$180(n - 2) =$	
Pentagon		$180(n - 2) =$	
Hexagon		$180(n - 2) =$	
Heptagon		$180(n - 2) =$	
Octagon		$180(n - 2) =$	
Nonagon		$180(n - 2) =$	
Decagon		$180(n - 2) =$	

- 1.a) What is the sum of angles in a hexagon?
- b) What is the value of x in the hexagon on the right?



2. Find the value of x in this shape.

$$120 + 6x + 8x - 8 + 7x + 4x + 14 + 5x - 6 = 720$$

Move 'regular numbers' to the right

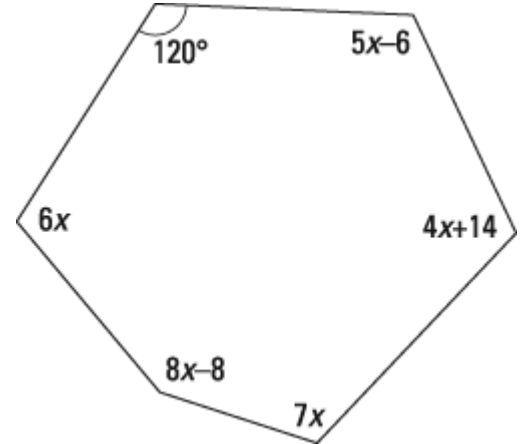
Keep 'x's on the left

$$6x + 8x + 7x + 4x + 5x = 720 - 120 + 8 - 14 + 6$$

$$30x = 600$$

$$x = 600 / 30$$

$$x = 20$$



3. Find the value of x in this shape.

HEPTAGONS have angles that add up to $180(n-2) = 900$

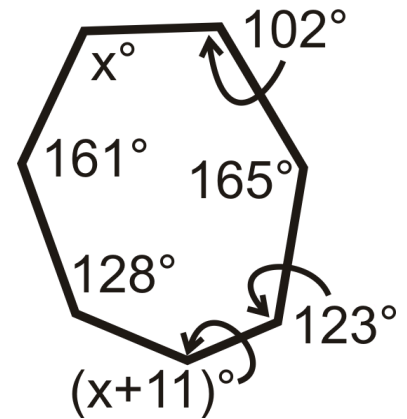
$$x + 161 + 128 + x + 11 + 123 + 165 + 102 = 900$$

$$x + x = 900 - 161 - 128 - 11 - 123 - 165 - 102$$

$$2x = 210$$

$$x = 210 / 2$$

$$x = 105$$



4. How many sides does a shape have if its sum of interior angles is 6300° ?

$$6300 = 180(n-2)$$

← solve dat

$$6300 / 180 = n - 2$$

$$35 = n - 2$$

$$35 + 2 = n$$

$$37 = n$$

37 sides shape

5. How many sides if the average angle is 141 ?

$$\frac{180(n-2)}{n} = 141$$

$$180(n-2) = 141n$$

$$180n - 360 = 141n$$

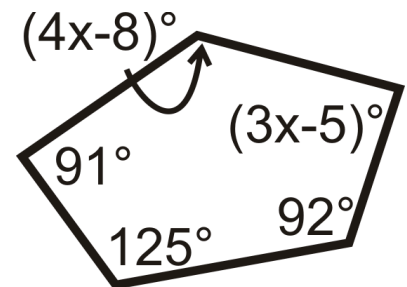
$$180n - 141n = 360$$

$$39n = 360$$

(not an integer, so it's not a good question)

Homework:

1. Solve for x in the figure on the right.



1. Find the sum of the interior angles of a polygon with
- a) 10 sides
 - b) 15 sides
 - c) 20 sides

For help with question 2, see Example 2.

2. Find the measure of each interior angle of a regular polygon with
- a) 7 sides
 - b) 12 sides

For help with question 3, see Example 3.

3. How many sides does a polygon have if the sum of its interior angles is
- a) 540° ?
 - b) 1800° ?
 - c) 3060° ?

9. a) Find the measure of each interior angle of a regular 10-sided polygon. Use a second method to check your answer.
- b) Find the measure of each interior angle of a regular 16-sided polygon.
- c) Find the measure of each interior angle of a regular 20-sided polygon.
- d) Write an expression for the measure of each interior angle of a regular polygon with n sides.
10. a) How many sides does a Canadian dollar coin have?
- b) What is the measure of the angle between adjacent sides of the coin?
- c) Suggest reasons why the Royal Canadian Mint chose this shape.