Name______________________________ Must pass Mastery Check by:_______________

Write your questions here!

Polygon Angle Exploration

We all know that the sum of the angles of a triangle equal 180°. What about a quadrilateral? A pentagon? We can answer this question by looking for a pattern:

# of Sides	Picture	# of Δ's	sum of all interior angles
3			
4			
5			
6			
⋮			
n			

Polygon Angle-Sum Theorem:

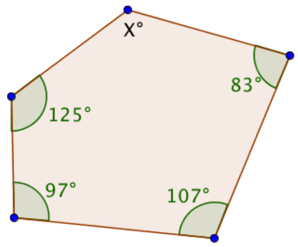
The sum of the measures of the interior angles of a polygon is ____________________ where n is the number of sides of the polygon.

PACKET 5.1: POLYGON ∡-SUM THEOREM

Write your questions here!

Examples:

Find x.



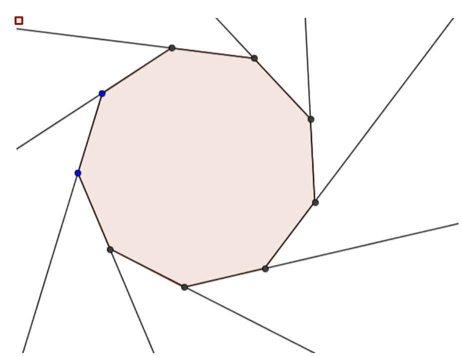
What about Regular Polygons?

Because each polygon with n sides also has n angles of equal measure, you can divide the sum of the angles by n to find the measure of one angle.

Regular Polygon Interior Angle Theorem:

The measure of ONE of the interior angles of a regular polygon is ______________________ where n is the number of sides of the polygon.

What about Exterior Angles?



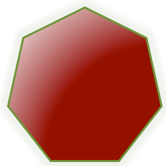
Polygon Exterior Angle-Sum Theorem:

The sum of the measures of the exterior angles of ANY polygon is 360°.

Write your questions here!

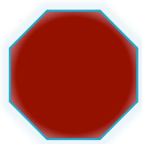
Examples:

Find the measure of one interior angle in each regular polygon.

1. 

2. regular 15-gon

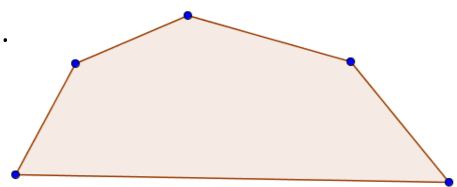
Find the measure of one exterior angle in each regular polygon.

3. 

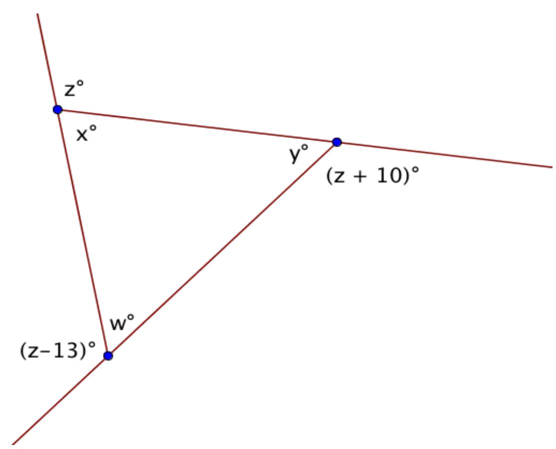
4. regular 13-gon

Find the sum of the interior angles for each polygon.

5. a decagon

6. 

Find the value of each variable:

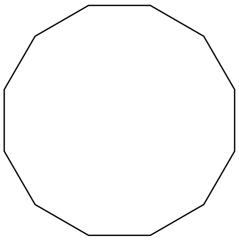


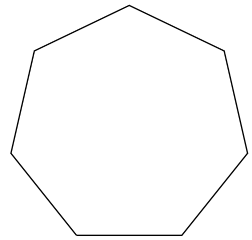
Now, summarize your notes here!

Geometry

Practice 5.1

Find the interior angle sum for each polygon. Round your answer to the nearest tenth if necessary.

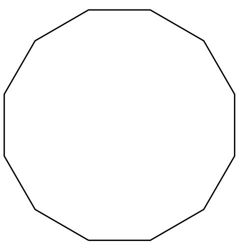
1)


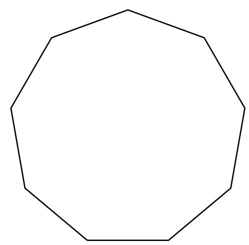
2)


3) regular 19-gon

4) regular 14-gon

Find the measure of one exterior angle in each regular polygon. Round your answer to the nearest tenth if necessary.

5)


6)


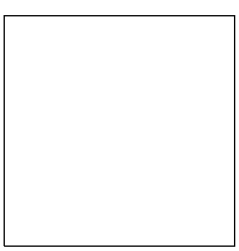
7) regular octagon

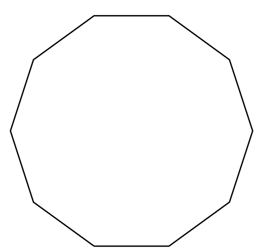
8) regular 15-gon

9) regular 11-gon

10) regular pentagon

Find the measure of one interior angle in each regular polygon. Round your answer to the nearest tenth if necessary.

11)


12)


13) regular 14-gon

14) regular 24-gon

15) regular 20-gon

16) regular 17-gon

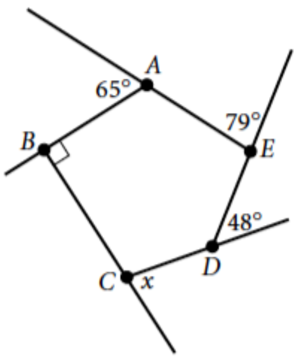
Always check your work!

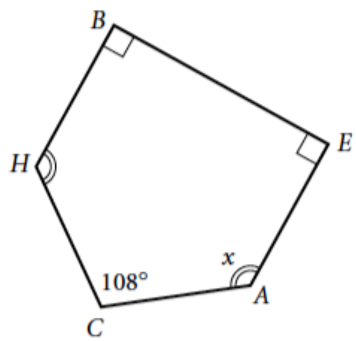
5.1 Application and Extension

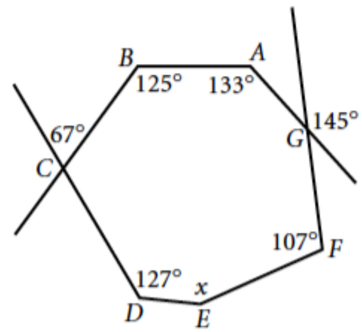
1. Find the measure of one interior angle in a regular 14-gon.

2. Find the measure of one exterior angle in a regular 20-gon.

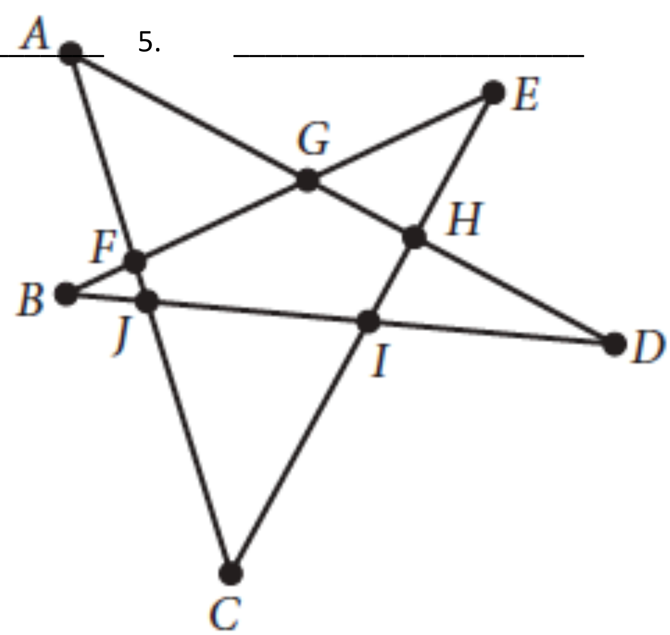
For problems 3 – 5, find the value of x.







3.______________________ 4. ______________________ 5. ______________________

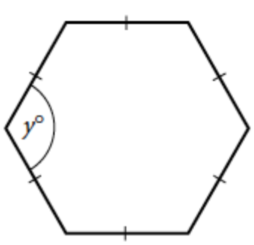


6. In the figure at the right, $m\angle A = 45°$, $m\angle JFG = 100°$, $m\angle FJI = 112°$, $m\angle GHI = 91°$, and $m\angle C = 44°$. Find the indicated measures.

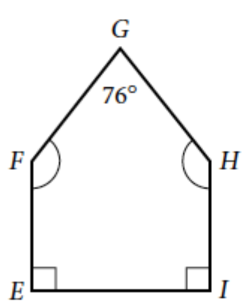
$m\angle B$ ______________	$m\angle FGH$ ____________
$m\angle DHI$ ____________	$m\angle HIJ$ ____________
$m\angle D$ ______________	$m\angle E$ ______________

7. The exterior angle of a polygon is 24°.
Find the number of sides in the polygon.

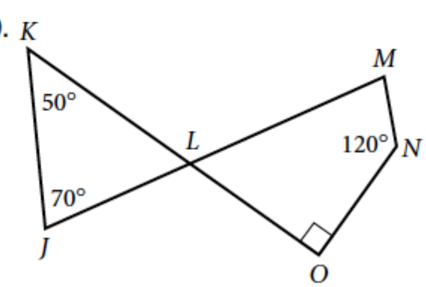
8.



9.



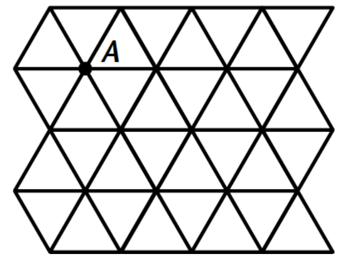
10.



y ______________________ $m\angle F$ ____________________ $m\angle M$ ____________________

[PACKET 5.1: POLYGON ∡-SUM THEOREM]

A tessellation is a pattern of congruent figures that completely covers a plane without gaps or overlaps. A tessellation that consists of exactly one type of regular polygon, with each polygon congruent to all the others, is called a regular tessellation. Any point where the polygons share a common vertex is a vertex point of the tessellation. The figure at right, for instance, shows a regular tessellation of equilateral triangles with one vertex point labeled A.



For Exercises 11–14, refer to the regular tessellation to the right.

11. What is the measure of each interior angle of each equilateral triangle? _________

12. How many equilateral triangles meet at each vertex point? ___________________

13. What is the sum of the measures of all the angles at each vertex point? ________________

14. Based on your answers to Exercises 11–13, explain why it is not possible to make a regular tessellation that consists of regular pentagons.

Algebra Review

Solve each equation for x!

1. $-2x - 3 = 5x - 31$

2. $2(x - 5) - 2 = -4$

Multiply!

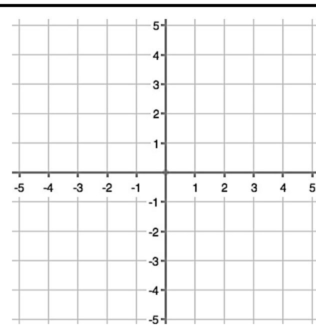
3. $(x - 4)(x + 2)$

Factor!

4. $(x^2 + 6x + 8)$

5. Graph the equation:

$y = 2 - x$



6. Graph the equation:

$y = -\frac{4}{5}x$