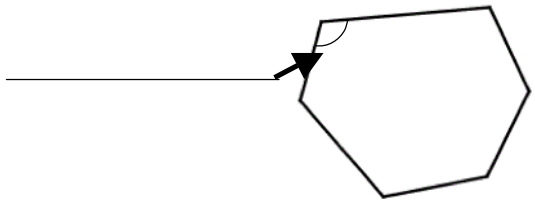
6.1

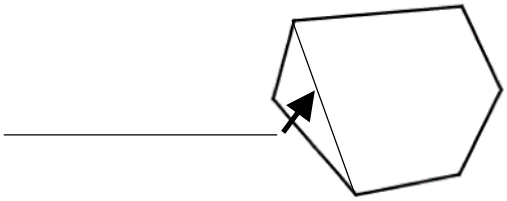
Name (print first and last) _____ **Per**_____ **Date:** 12/9 due 12/11

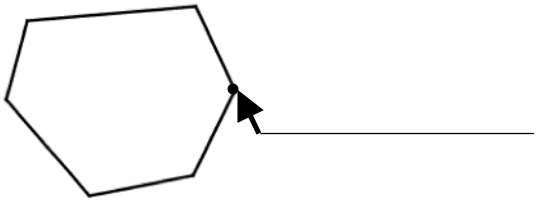
6.1 Polygons **Geometry Regents 2013-2014 Ms. Lomac**

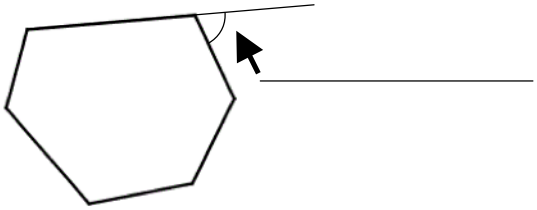
SLO: I can identify, describe, and sketch polygons, find the sum of the interior and exterior angles and find the measure of one interior or one exterior angle of a regular polygon.

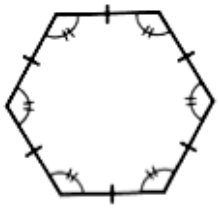
(1) ☐ A **polygon** is a closed 2-dimensional figure composed of line segments that intersect at the **vertices** of the **polygon** and nowhere else. A point where 2 line segments intersect is called a **vertex** (corner). **Diagonals** are segments that connect 1 **vertex** to another through the interior of the **polygon**. **Interior angles** are inside/outside (circle one) the **polygon** and _____ **angles** are outside the polygon and form a **linear pair** with an **interior angle** of the polygon. All sides and angles are congruent for **regular polygons**. Use the terms above to identify the parts of the diagrams below.











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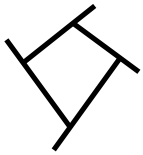
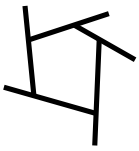
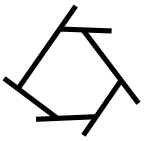
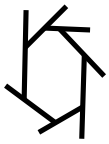
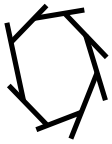
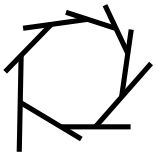
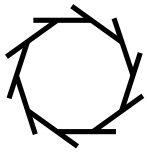
(2) ☐ Explore interior and exterior angles of polygons

- ☐ Obtain a mini poster page and cutout and 2 colored markers.
- ☐ Each group should have a "Group directions for mini posters" page to share, 2-3 pairs of scissors and 1 roll of tape
- ☐ Complete steps 1-9 for the left side.
- ☐ Complete steps 1-6 for the right side.
- ☐ Tape your mini poster to the wall for others to see.
- ☐ Complete columns 1, 2, 3, 4 and 6 on the "Polygon Angles Pattern & Formula Page." (the back of this page)
  You should use the mini posters on the wall to help you.

6.1 Polygon Angles Pattern & Formula Page

	1 Shape Name	2 # of sides	3 # of triangles	4 Sum of interior angles.	5 1 interior angle REGULAR ONLY	6 Sum of exterior angles	7 1 exterior angle REGULAR ONLY
							
							
							
							
							
							
							
							
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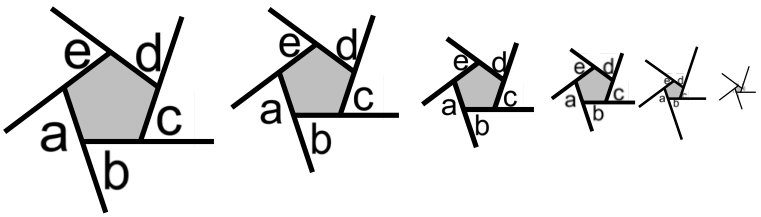
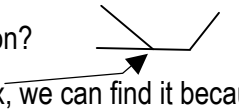
(3) ☐ Another way to look at the sum of the exterior angles of a polygon is illustrated in the diagram below. As the vertices of the exterior angles move together, eventually they will share the same vertex at a point and their sum will be _____ because the sum of the angles around a point is _____.



(4) ☐ What if we want to know the measure of 1 interior or 1 exterior angle of a polygon?



☐ If we know 1 interior angle and we want to know the exterior angle at that vertex, we can find it because the two angles form a _____ _____ which means that the sum of the two angles is _____.

☐ If we know 4 interior angles of a pentagon and want to know the measure of the last interior angle we could _____ the angles that we know and _____ the total from _____.

☐ If we know an octagon is regular, we know that the measures of the interior angles are _____. We also know that it has _____ sides. We can find the measure of 1 interior angle by _____ the interior angle sum by _____. Use this idea to complete column 5 on the "Polygon Angles Pattern & Formula Page."

☐ If we know a heptagon is regular, we know that the measures of the exterior angles are _____. We also know that it has _____ sides. We can find the measure of 1 exterior angle by _____ _____ by _____. Use this idea to complete column 7 on the "Polygon Angles Pattern & Formula Page."

(5) ☐ EXAMPLES

a. Find the measure of 1 interior angle of a regular 18-gon.

b. Find the sum of the angles of a 50-gon.

c. One exterior angle of a regular polygon is 22.5°. Find the number of sides

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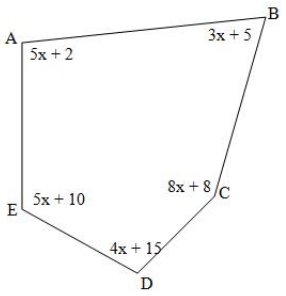
d. Find the measure of angle B



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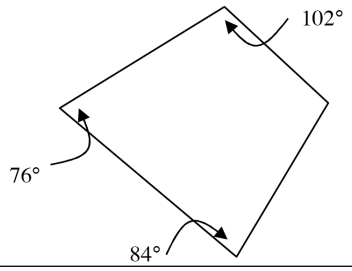
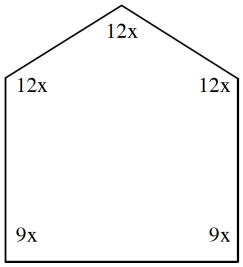
(6) ☐ Use what you have learned and the information on the "Polygon Angles Pattern & Formula Page" to help you write equations and solve the problems below. Large versions of the problems are on dry erase boards if you would like to use them.

☐ (a) Find the missing angle measure in the quadrilateral.

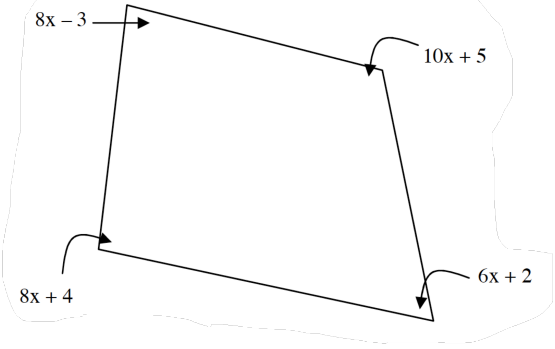


☐ (b) What is the value of "x"?

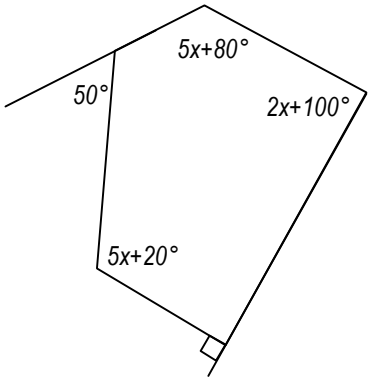
A. 12
B. 9
C. 10
D. 15



☐ (c) Find the measure of the smallest angle in the quadrilateral.



☐ (d) Find the measure of x



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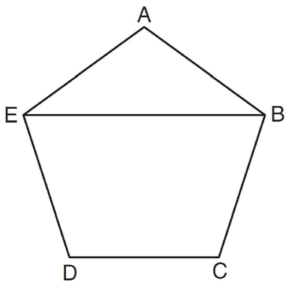
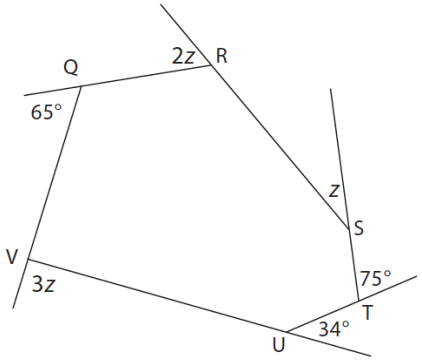
☐ (e) In the diagram below of regular pentagon *ABCDE*, $\overline{EB}$ is drawn.



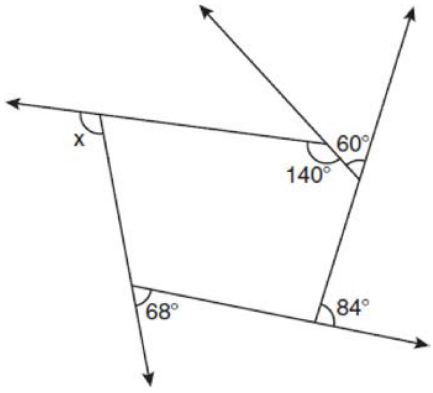
What is the measure of $\angle AEB$?

1) 36°
2) 54°
3) 72°
4) 108°

☐ (f) Find the value for *z*.



☐ (g) The pentagon in the diagram below is formed by five rays.



What is the degree measure of angle *x*?

1) 72
2) 96
3) 108
4) 112

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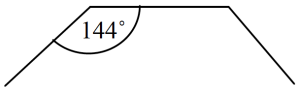
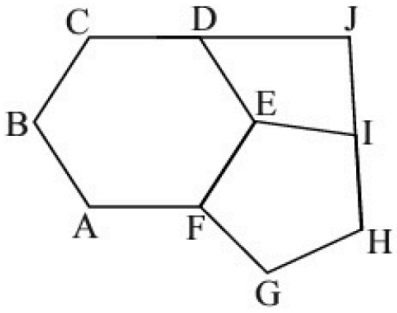
☐ (h) Part of a regular polygon is shown below. Use the information to determine the measure of 1 exterior angle and the number of sides the polygon has.



☐ (i) *ABCDEF* is a regular hexagon. *EFGHI* is a regular pentagon. Find:



$m\angle DEF =$ _____

$m\angle FEI =$ _____

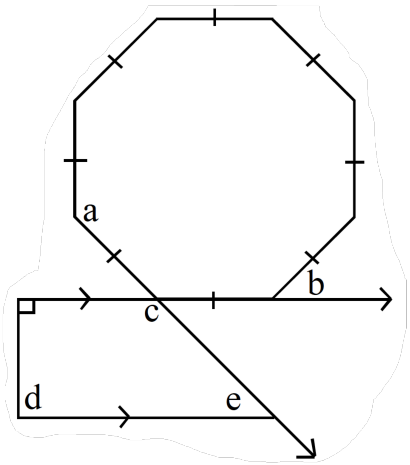
$m\angle JDE =$ _____

$m\angle DEI =$ _____

$m\angle JIE =$ _____

$m\angle J =$ _____

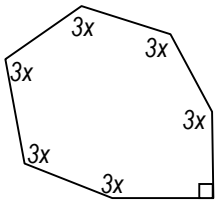
☐ (j) CHALLENGE: The octagon is regular. Find the measure of the lettered angles.



6.1 Exit Ticket Name_____Per_____

- ☐ I got this!
- ☐ I can with a bit of help
- ☐ I will, given lots of help
- ☐ I can't
- ☐ I won't bother to
- ☐ I refuse to

Find the value for *x*.



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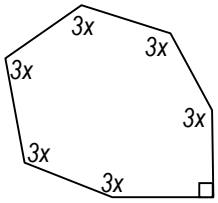

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Find the value for *x*.