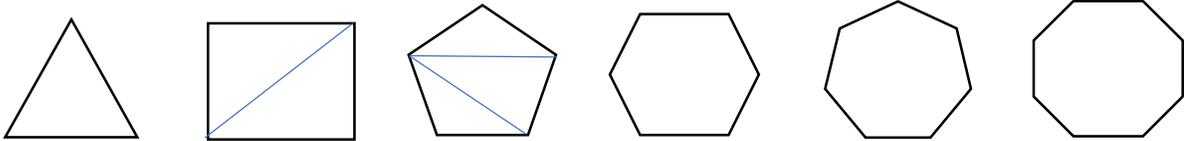


# POLYGON MATH LAB

Complete the table below. Draw lines connecting one vertex with all the other vertices. The first 3 are done for you. Then, fill in the table below.



POLYGON	NUMBER OF SIDES	NUMBER OF TRIANGLES	FORMULA Multiply the number of triangles by $180^\circ$	TOTAL MEASURE OF ALL INTERIOR ANGLES
triangle	3	1	$1(180^\circ)$	$180^\circ$
quadrilateral				
pentagon				
hexagon				
heptagon				
octagon				
any polygon	$n$			

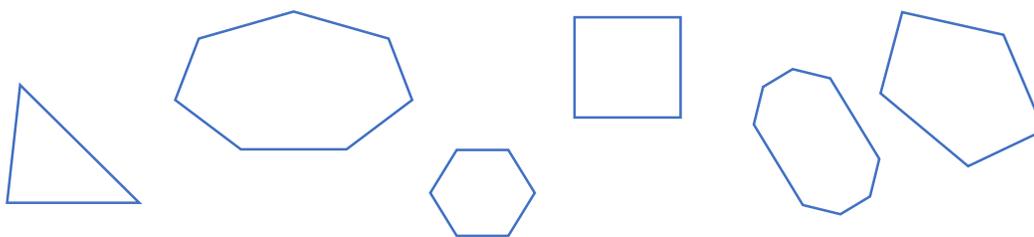
1. What is the pattern between the number of sides and the number of triangles?
2. Complete the table to find the number of degrees for any polygon with sides  $n$ . Copy the formula here.

3. Use the rule to find the number of degrees for the following figures.

a. 12-sided figure

b. 100-sided figure

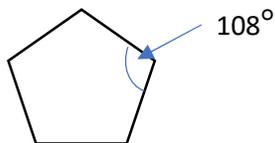
4. Some of the following are regular polygons. Some of them are not. Circle the regular polygons.



5. We calculate the measurement of one angle of a regular polygon by dividing the *total sum of the angles by the number of angles*.

*For example, the total of the interior angles of a pentagon are  $540^\circ$ .*

*There are 5 sides, so there are 5 angles. Divide  $540^\circ$  by 5. Each angle is  $108^\circ$ .*



$$(5 - 2)180^\circ = 540^\circ$$

$$540^\circ \div 5 = 108^\circ$$

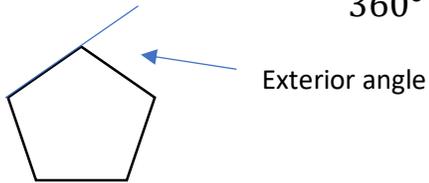
What is the measure of an interior angle of following regular polygons?

a. regular hexagon

b. regular decagon

6. We can also determine the measure of one exterior angle. Since all the angles add to  $360^\circ$ , a single angle is  $360^\circ$  divided by the number of angles.

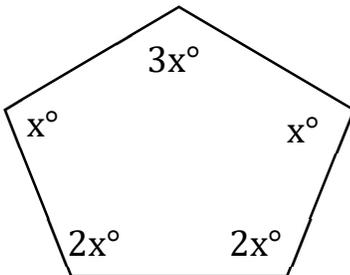
$$360^\circ \div 5 = 72^\circ$$



What is the measure of an exterior angle of following regular polygons?

- a. regular octagon
- b. regular 80-gon

7. Look at the figure below. All the angles add to  $540^\circ$ . Write an equation that adds up the angles so that they equal  $540^\circ$ , then solve for  $x$ .



## KEY IDEAS

### Polygon Interior Angle Sum

$(n-2) \times 180^\circ$  where  $n$  is the number of sides

### regular polygon

A polygon with the same length for each side. Every angle in the polygon has the same measure.

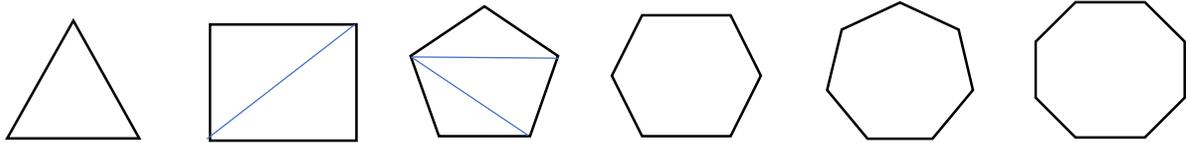
### Polygon Exterior Angle Sum 8

All angles total to  $360^\circ$

# ANSWERS

## POLYGON MATH LAB

Complete the table below. Draw lines connecting one vertex with all the other vertices. The first 3 are done for you. Then, fill in the table below.



POLYGON	NUMBER OF SIDES	NUMBER OF TRIANGLES	FORMULA Multiply the number of triangles by $180^\circ$	TOTAL MEASURE OF ALL INTERIOR ANGLES
triangle	3	1	$1(180^\circ)$	$180^\circ$
quadrilateral	4	2	$2(180^\circ)$	$360^\circ$
pentagon	5	3	$3(180^\circ)$	$540^\circ$
hexagon	6	4	$4(180^\circ)$	$720^\circ$
heptagon	7	5	$5(180^\circ)$	$900^\circ$
octagon	8	6	$6(180^\circ)$	$1080^\circ$
any polygon	n	n-2	$(n-2)(180^\circ)$	

8. What is the pattern between the number of sides and the number of triangles?

The number of triangles is 2 less than the number of sides

9. Complete the table to find the number of degrees for any polygon with sides n. Copy the formula here.

(student should fill in the table)  $(n-2)(180^\circ)$

10. Use the rule to find the number of degrees for the following figures.

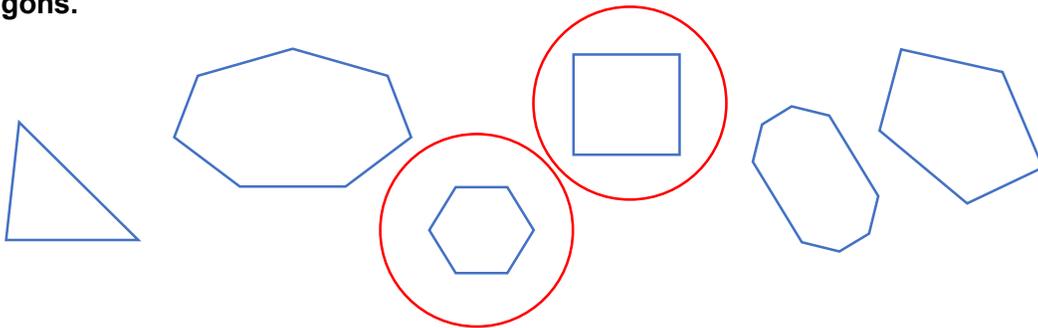
c. 12-sided figure

$$(12-2)(180^\circ) = 1800^\circ$$

d. 100-sided figure

$$(100-2)(180^\circ) = 17640^\circ$$

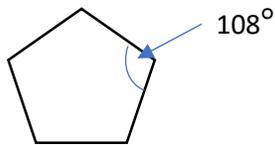
11. Some of the following are regular polygons. Some of them are not. Circle the regular polygons.



12. We calculate the measurement of one angle of a regular polygon by dividing the *total sum of the angles by the number of angles*.

*For example, the total of the interior angles of a pentagon are  $540^\circ$ .*

*There are 5 sides, so there are 5 angles. Divide  $540^\circ$  by 5. Each angle is  $108^\circ$ .*



$$(5-2)180^\circ = 540^\circ$$

$$540^\circ \div 5 = 108^\circ$$

What is the measure of an interior angle of following regular polygons?

a. regular hexagon

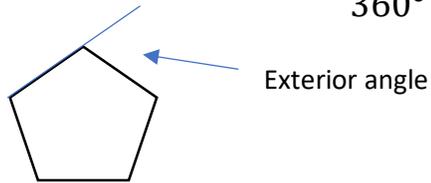
$$(6-2)180^\circ = 720^\circ \quad 720^\circ \div 6 = 120^\circ$$

b. regular decagon

$$(10-2)180^\circ = 1440^\circ \quad 1440^\circ \div 10 = 144^\circ$$

13. We can also determine the measure of one exterior angle. Since all the angles add to  $360^\circ$ , a single angle is  $360^\circ$  divided by the number of angles.

$$360^\circ \div 5 = 72^\circ$$



What is the measure of an exterior angle of following regular polygons?

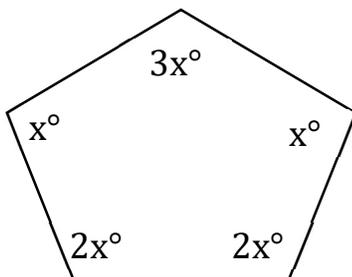
- c. regular octagon

$$360^\circ \div 8 = 45^\circ$$

- d. regular 80-gon

$$360^\circ \div 80 = 4.5^\circ$$

14. Look at the figure below. All the angles add to  $540^\circ$ . Write an equation that adds up the angles so that they equal  $540^\circ$ , then solve for  $x$ .



$$\begin{aligned} x + 2x + 2x + x + 3x &= 540^\circ \\ 9x &= 540^\circ \\ x &= 60^\circ \end{aligned}$$

## KEY IDEAS

### Polygon Interior Angle Sum

$(n-2) \times 180^\circ$  where  $n$  is the number of sides

### regular polygon

A polygon with the same length for each side. Every angle in the polygon has the same measure.

### Polygon Exterior Angle Sum

All angles total to  $360^\circ$