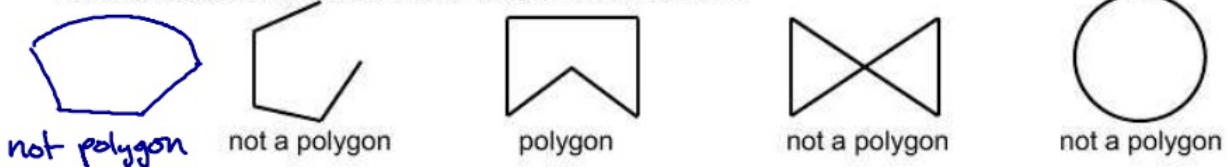
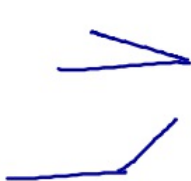
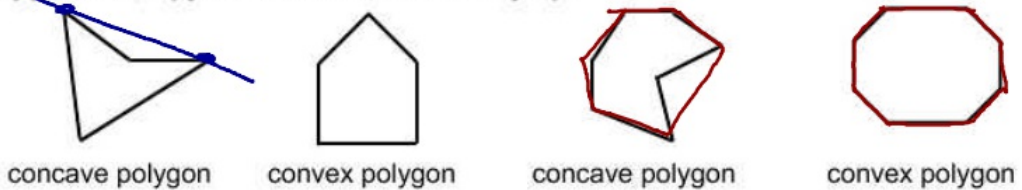


A **polygon** is a closed geometric plane figure made up of three or more segments. Each endpoint is referred to as a vertex and all the endpoints are **vertices**

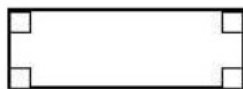


A **concave polygon** is a polygon around which a rubber band cannot fit tightly.
 A **convex polygon** is a polygon a rubber band can fit tightly.

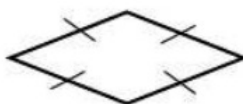


Polygon	Number of Sides	Polygon	Number of Sides
Triangle	3	Octagon	8
Quadrilateral	4	Nonagon	9
Pentagon	5	Decagon	10
Hexagon	6	Undecagon	11
Heptagon	7	Dodecagon	12

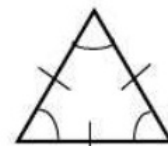
An **equilateral polygons** has all congruent sides.
 An **equiangular polygons** has all congruent angles.
 A **regular polygon** is equilateral and equiangular.



equiangular quadrilateral

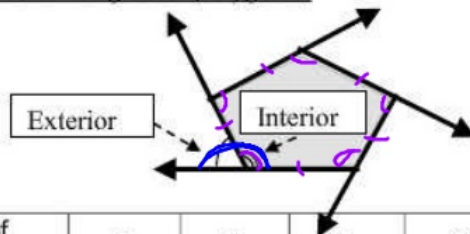


equilateral quadrilateral



regular triangle

Interior and exterior angles of polygons:



Linear Pair
 Interior \angle + Exterior \angle = 180°

$n = \# \text{ of sides} = \# \text{ of angles}$

Number of Sides	0	1	2	3	4	5	6	n
Sum of Interior Angles	----	----	----	180°	360°	540°	720°	$180(n-2)$
Sum of Exterior Angles	----	----	----	360°	360°	360°	360°	360°

Ex1) Find the sum of the interior angles in a nonagon. 9

$$\begin{aligned} &180(9-2) \\ &180(7) \\ &1260^\circ \end{aligned}$$

Ex2) Find each interior angle and each exterior angle in a regular dodecagon. 12

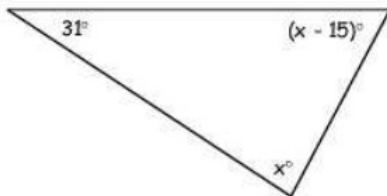
Int: 150° $180(12-2)$
 $180(10)$
 1800

Ext. $\frac{360}{12} = 30^\circ$

$$\frac{1800}{12 \text{ angle}} = 150^\circ$$

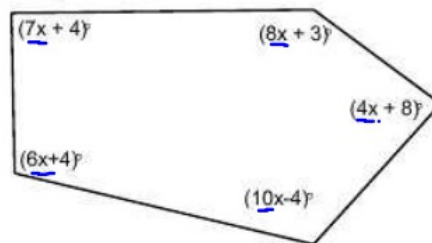


EX3) Solve for x.



$$\begin{aligned} (31^\circ) + x + (15) + x &= 180^\circ \\ 2x + 16 &= 180 \\ 2x &= 164 \\ x &= 82 \end{aligned}$$

Ex4) Solve for x



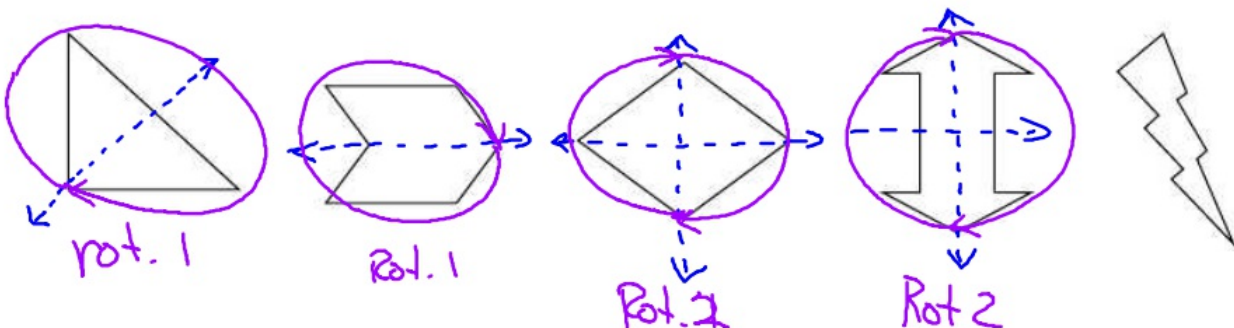
$$35x + 15 = 540$$

$$x = 15$$

A figure has **line symmetry** if it can reflect onto itself and the line of symmetry divides the figure into two halves, where one is the mirror image of the other.

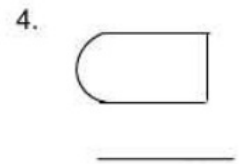
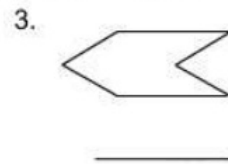
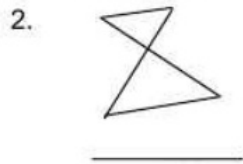
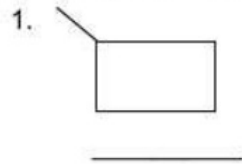
A figure has **rotational symmetry** if it can rotate onto itself two or more times in one turn. The order of rotational symmetry is the number of times a figure fits onto itself in one turn.

Ex5) Draw lines of symmetry through the figures below to show if line symmetry exist. Write 'the order of rotation and degrees of rotation for each of the figures below if rotational symmetry exist.

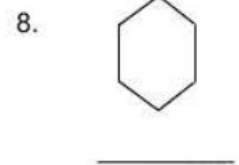
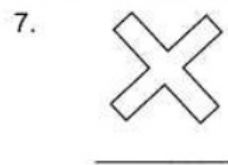
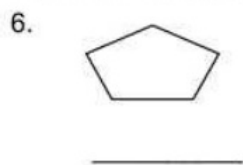
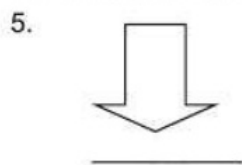


Assignment: T2-24 Polygons

Which figures are polygons? Answer yes or no. If no, explain why not.



Which polygons are convex and which are concave? Name each polygon.



Sketch each of the polygons. Include any necessary congruent marks.

9. Regular Octagon

10. Concave Triangle

11. Equiangular Pentagon

12. Equilateral Hexagon

13. Convex Quadrilateral

14. Concave Heptagon

Find the sum of the measures of the interior angles of each convex polygon.

15. decagon

16. 16-gon

17. 30-gon

sum of int. \angle = _____

sum of int. \angle = _____

sum of int. \angle = _____

The number of sides of a regular polygon is given. Find the measure of an interior angle and an exterior angle for each polygon.

18. $n = 10$

19. $n = 5$

20. $n = 12$

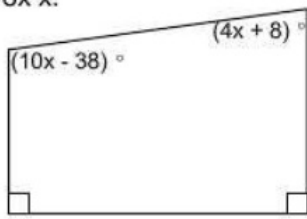
int. \angle = _____
ext. \angle = _____

int. \angle = _____
ext. \angle = _____

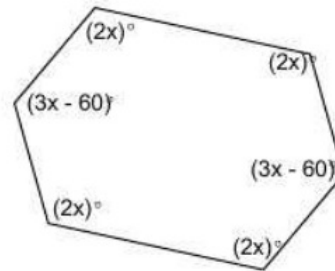
int. \angle = _____
ext. \angle = _____

Solve for x.

21.

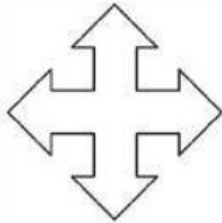


22.



Write the order of rotational symmetry under each shape and the degrees of rotation. Also draw lines to indicate lines of symmetry.

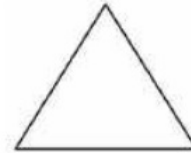
23.



24.



25.



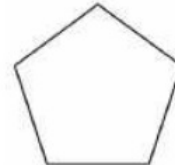
26.



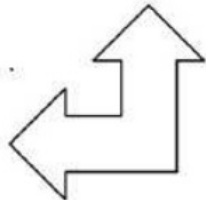
27.



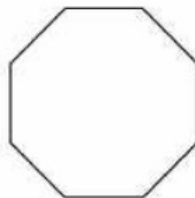
28.



29.

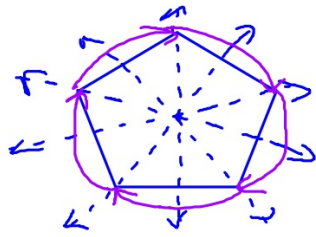


30.



31.





Rot. 5

Regular Pentagon.