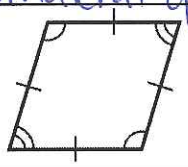
Notes 6-1: Properties and Attributes of Polygons — **Geometry - Ch. 6: *Polygons and Quadrilaterals***

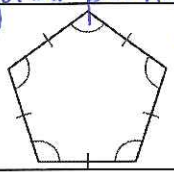
Objectives: *Classify polygons based.* *Find and use the measures of interior and exterior angles of polygons.*

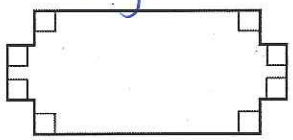
Polygon: a 2-dimensional, closed figure made from 3 or more line segments.

- ***Diagonal*:** connects two non-adjacent vertices.
- ***Regular Polygon*:** a polygon which is both equilateral and equiangular.
- ***Concave Polygon*:** if any diagonal is on the exterior of the polygon. (these *cave-in*, and look weird)
- ***Convex Polygon*:** all diagonals are in the interior of the polygon. (these are more round, and look normal)

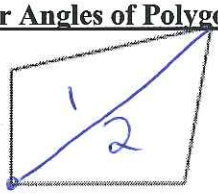
EX 1: Describe the polygon using 2 words.

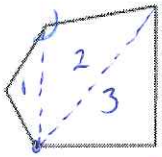
a) equilateral quadrilateral 

b) regular pentagon 

c) dodecagon 

Interior Angles of Polygons: Divide the polygons by drawing all the diagonals from one vertex





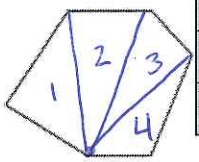


Figure	# of Sides	# of Triangles	Expression for Sum of Angles	Sum of Degrees
triangle	3	1	1(180)	180°
quadrilateral	4	2	2(180)	360°
pentagon	5	3	3(180)	540°
hexagon	6	4	4(180)	720
heptagon	7	5		900
octagon	8	6		1080
n-gon	n	n-2	(n-2) 180	(n-2)(180)

- *Sum of Interior Angles* = (n-2)(180)
- *One Angle on a Regular Polygon* = $\frac{(n-2)(180)}{n}$

EX 2: Find the **sum** of the interior angles of a convex octagon.

n=8

Sum (8-2)(180)

6(180

1080

EX 3: Find the measure of **each** interior angle of a ***regular nonagon***.

n=9

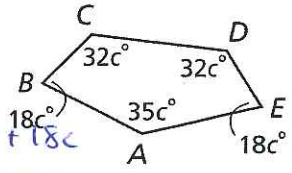
S=(9-2)(180)

7(180)

1260

$\frac{1260}{9}$ = 140° each

EX 4: Find the value of *c*.



Pent. = 540

32c+32c+35c+18c+18c = 540

135c = 540

c = 4

Exterior Angles of Polygons:

- *Sum of Exterior Angles* = 360 ← doesn't matter what shape
- *One Exterior Angle of a Regular Polygon* = $\frac{360}{n}$

EX 5: Find the measure of each exterior angle of a ***regular hexagon***.

n=6

$\frac{360}{6}$ = 60°

EX 6: Find the value of *b*.

33b+16b+10b+28b+15b+18b=

$\frac{120b}{120} = \frac{360}{120}$

b = 3