

Chapter 2: Geometry

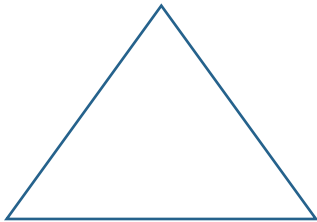
2.3 Polygons

Definitions

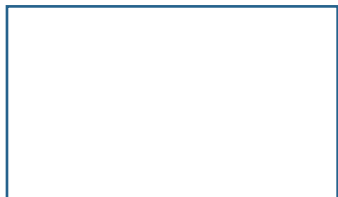
Convex	Concave
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Interior Angles in convex polygon:

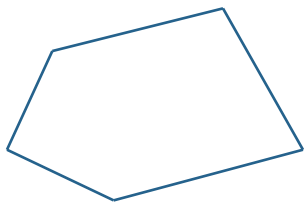
Triangle



Quadrilateral



Pentagon



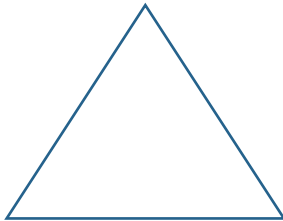
Etc...

Conclusion: **the sum of interior angles in an n -sided polygon is _____**

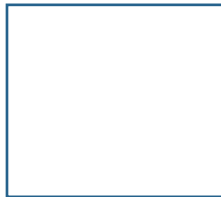
Definition:

Regular Polygon = when a polygon has equal _____ AND equal _____

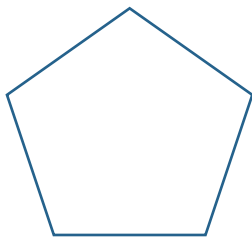
Equilateral Triangle



Square



Regular Pentagon



Etc..

Formula for one interior angle in a regular polygon is $\frac{(n-2)180^\circ}{n}$

Examples:

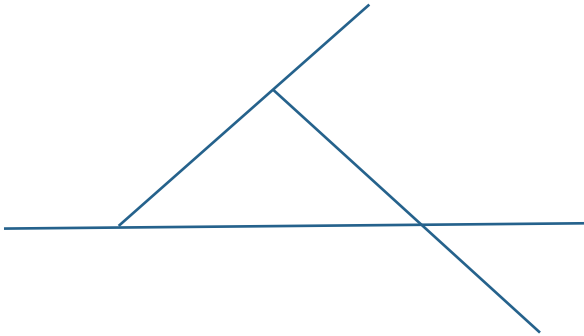
Example #1: Find the **sum** of the interior angles in a 7-sided polygon:

Example #2: Find the **sum** of the interior angles in a 12-sided polygon

Example #3: Find the measure of **one** angle in a regular 10-sided polygon

Example #4: Find the measure of **one** angle in a regular 24-sided polygon

Did you know?
3 sides = triangle
4 sides = quadrilateral
5 sides = pentagon
6 sides = hexagon
7 sides = heptagon
8 sides = octagon
9 sides = nonagon
10 sides = decagon
11 sides = undecagon
12 sides = dodecagon
.
 n sides = n -gon

Exterior angles in a polygon

The exterior angles are _____ to each internal angle

Rule

The sum of exterior angles of a polygon is always _____

Therefore, each exterior angle of a regular polygon is

Examples:

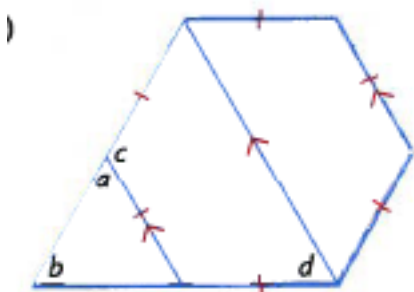
Example #5: Find the **sum** of the exterior angles in a 15-sided polygon

Example #6: Find the measure of **one** exterior angle in a regular 9-sided polygon

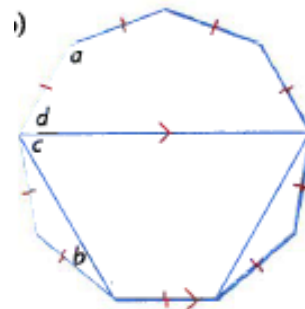
Example #7: Find the measure of **one** interior angle in a regular 9-sided polygon

- 5) a) Determine the measure of each exterior angle of a regular octagon.
- b) Use your answer for part a) to determine the measure of each interior angle of a regular octagon.
- c) Use your answer for part b) to determine the sum of the interior angles of a regular octagon.
- d) Use the function $S(n) = 180(n-2)$ to determine the sum of the interior angles of a regular octagon. Compare your answer with the sum you determined in part c)
- 6) In each figure shown in the textbook, the congruent sides form a regular polygon. Determine the values of a , b , c , and d .

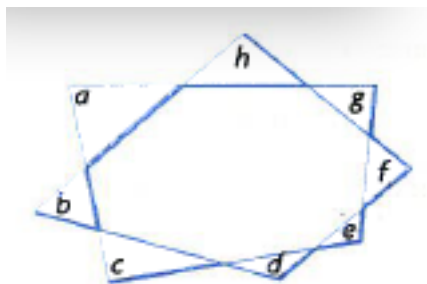
a)



b)



- 7) Determine the sum of the measures of the indicated angles.



Answer Key

- 1) a) 1800 b) 150
- 2) 3240
- 3) 19
- 4) about 147
- 5) a) 45 b) 135 c) 1080 d) 1080
- 6) a) $a=60, b=60, c=120, d=60$
b) $a=140, b=20, c=60, d=60$
- 7) 720