

Section 3.5 - Angles of a Polygon Notes

Directions: Read pgs. 101 – 103 in the text. Fill in the notes below, then answer the questions.

A polygon is formed by coplanar segments such that:

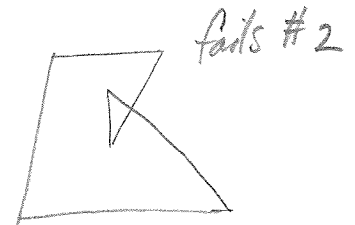
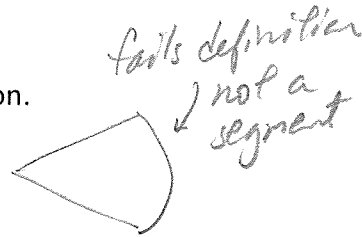
Conditions

- (1) Each segment intersects exactly two other segments, one at each endpoint
- (2) No two segments with a common endpoint are collinear.

Draw an example of a polygon.



Draw an example of a figure that is not a polygon.



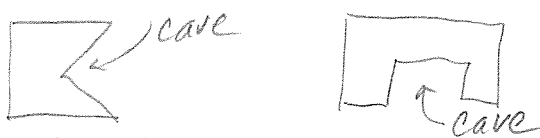
A **convex polygon** is a polygon such that no line containing a side of the polygon contains a point in the interior of the polygon. EX:

Draw a polygon that is convex.



straight line test
 - draw straight line
 - crosses at most 2 sides.
 every \angle less than 180°

Draw a polygon that is not convex. (also "concave") \rightarrow "cave"

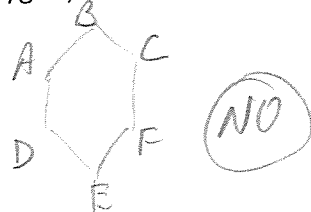
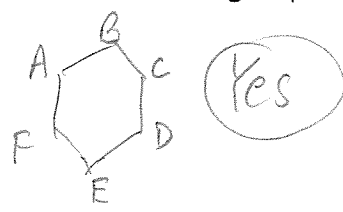


straight line
 at least 1 straight line,
 crosses more than 2 sides
 at least 1 \angle is $> 180^\circ$

Note #1: A polygon that is not convex is sometimes called a nonconvex or concave polygon.

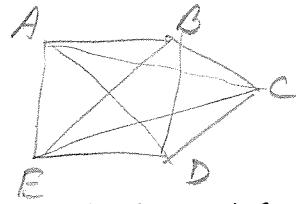
Note #2: You should be able to name all polygons up to 10 sides.
 triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, decagon

Note #3: When referring to (or naming) a polygon, we list its consecutive vertices in order.



A diagonal is a segment joining 2 nonconsecutive vertices.

How many diagonals does a pentagon have? 5



To find the sum of the measures of the angles of a polygon draw all the diagonals from just ONE vertex of the polygon to divide the polygon into triangles. The number of triangles formed in each polygon is two less than the number of sides.

Thm. 3 - 13: The sum of the measures of the \angle s of a convex polygon with n sides is $(n-2)180$.

Ex: Find the sum of the measures of the interior angles of a 20-gon.

Answer: $(n-2)180 =$ interior angle sum

$n = 20$ so the interior angles sum is $(20 - 2)180 = \underline{3240}$ degrees.

Thm. 3 - 14: The sum of the measures of exterior \angle s of any convex polygon, one \angle at each vertex, is 360° .

Ex: Find the exterior angle sum of a 32-gon.

Answer: Since all polygons have an exterior angle sum of 360, the solution is 360.

Polygons can be equilateral or equiangular. If a polygon is both equilateral and equiangular it is called a regular polygon.

Ex: A regular polygon has 12 sides. Find the measure of each interior angle.

$$(12-2)180 = \frac{1800}{12} = 150^\circ$$

Complete pgs. 104 - 105 #1 - 6, 8 - 10, 12 - 19, 21 - 23.