3.3 Angles of Polygons p.120

* Polygon is a closed plane figure w/ 3 or more segments; intersect only @ endpoints
* RPJ p. 59-61 Activity 1, 3, 4

Polygon Names

3	triangle	8	octagon
4	quadrilateral	9	nonagon
5	pentagon	10	decagon
6	hexagon	11	undecagon
7	heptagon	12	dodecagon

* if the word "regular" precedes the name, all sides and all angles are congruent

Interior Angle Measures of a Polygon:

$$S = (n-2)\cdot 180°$$

S = Sum; n = # of sides of the polygon

Find the sum of the interior angles:

a) pentagon

$S = (5-2)\cdot 180$

$= 3\cdot 180$

$S = 540°$

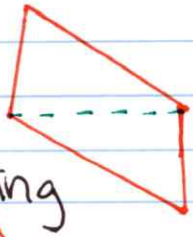
b) 18-gon

$S = (18-2)\cdot 180$

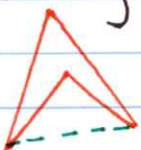
$= 16\cdot 180$

$S = 2880°$

convex polygon ~ when every line segment connecting any 2 vertices lies entirely inside the polygon



concave polygon ~ when at least one line segment connecting any two vertices lies outside the polygon



Finding the interior angle measure of a polygon:

① find the sum of the interior angles

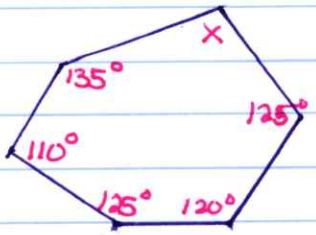
② add the angles given and subtract from the sum to find the missing angle

or

② if a regular polygon, divide by the number of angles/sides

Find the value of x

a)



$S = (6-2)\cdot 180$

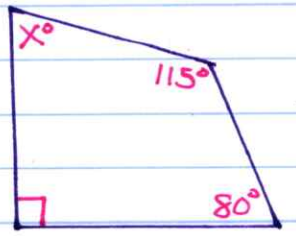
$4 \cdot 180$

720

$135+110+125+120+125 = 615$

$720 - 615 = 105°$

b)



$115+80+90 = 285$

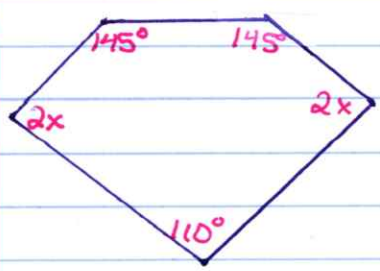
$360 - 285 = 75°$

c) Find the measure of the interior angle of a regular hexagon.

$S = (6-2)\cdot 180$

$\frac{720}{6} = 120°$

d)



$S = (5-2)\cdot 180$

$= 3 \cdot 180$

$= 540$

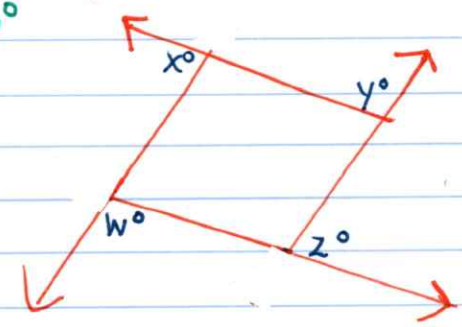
$145+145+2x+2x+110 = 540$

$400 + 4x = 540$

$4x = 140$

$x = 35$

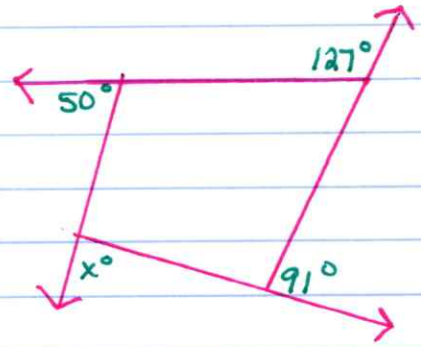
The sum of the measures of the exterior angles of a convex polygon is 360°



$x + y + w + z = 360$

Find the measures of the exterior angles:

a)

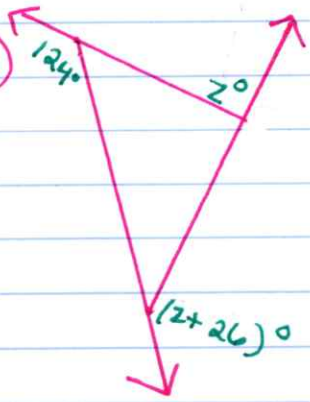


$50 + 127 + 91 + x = 360$

$268 + x = 360$

$x = 92°$

b)



$124 + z + 26 + z = 360$

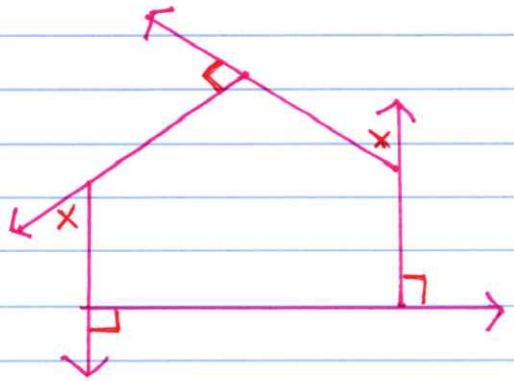
$2z + 150 = 360$

$2z = 210$

$z = 105°$

$z + 26 = 131°$

c)



$90 + 90 + 90 + x + x = 360$

$270 + 2x = 360$

$2x = 90$

$x = 45$

45°, 45°, 90°, 90°, 90°