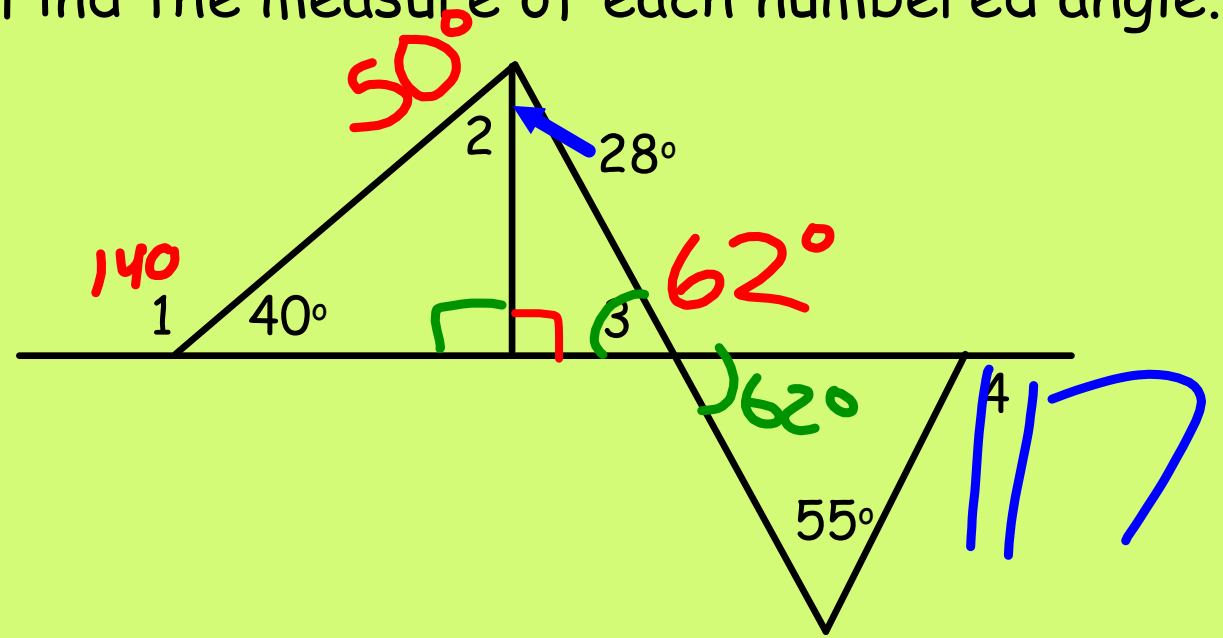
12/3/19 - Warm Up Problem

Find the measure of each numbered angle.

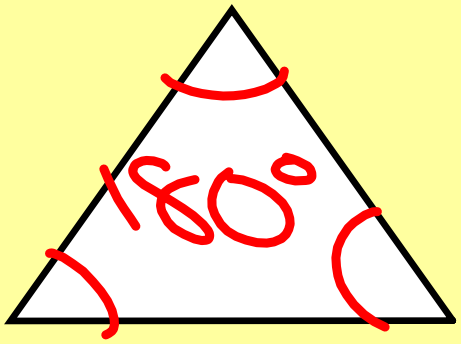


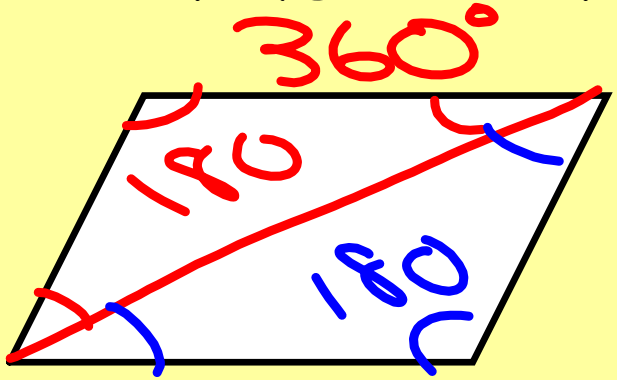
Concept 13 - Polygon Angle-Sum Theorems

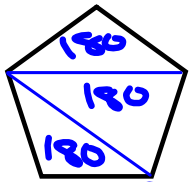
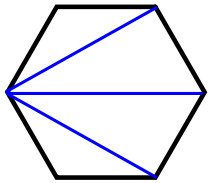
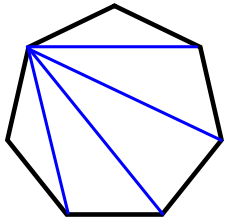
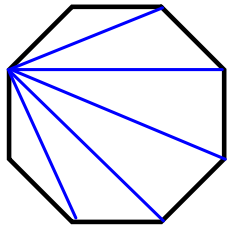
Goal: calculate interior and exterior angles of polygons

The Interior Angle Sum

What do all the interior angles of a polygon add up to?





PENTAGON	HEXAGON	HEPTAGON	OCTAGON
 180(3)			
# of sides = 5	# of sides = 6	# of sides = _____	# of sides = _____
# of triangles = 3	# of triangles = 4	# of triangles = _____	# of triangles = _____
INTERIOR ANGLE-SUM = 540 degrees	INTERIOR ANGLE-SUM = _____ degrees	INTERIOR ANGLE-SUM = _____ degrees	INTERIOR ANGLE-SUM = _____ degrees

13. How are the number of sides and the number of triangles related for each polygon above?

triangles = 2 less than sides

14. Write an algebraic expression to represent the number of triangles in a polygon with n sides.

n − 2

15. Write an algebraic expression to represent how you would find the interior angle-sum of a polygon with n sides.

(n-2)180

Polygon Angle-Sum Theorem

The sum of the measures of the interior angles of a convex n-gon is $(n - 2)180$.

Corollary to the Polygon Angle-Sum Theorem

The measure of each interior angle of a regular n-gon is $\frac{(n - 2)180}{n}$

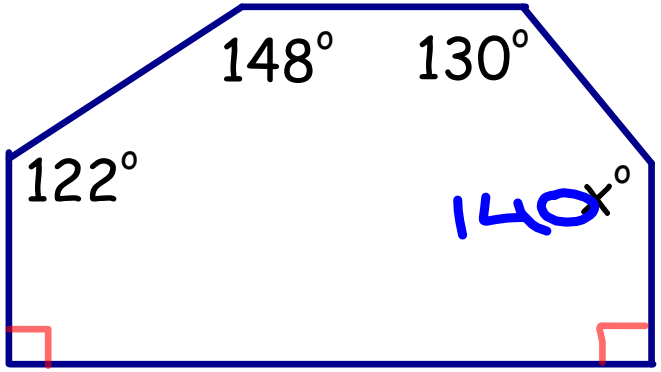
What is the interior angle sum of a 20-gon?

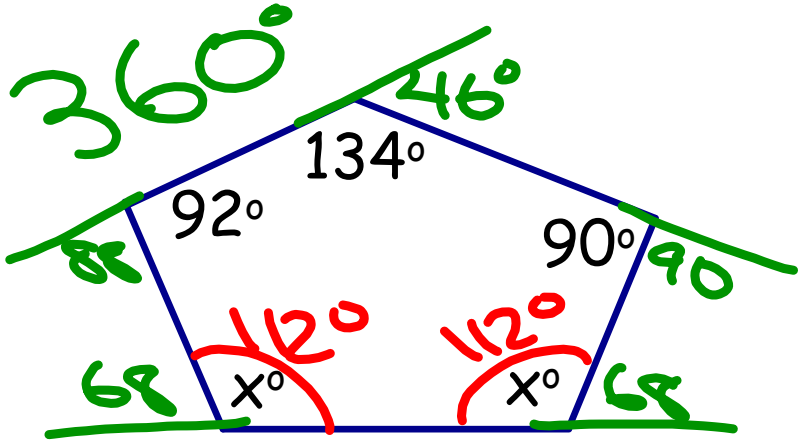
$(20-2)180$ $18(180) = 3240°$

What is the measure of one interior angle of a regular 20-gon?

$\frac{3240}{20} = 162°$

Find the value of x in each polygon.





$(6-2)180 = 720$

-580

140

90
90
122
148
+ 130

$(5-2)180 = 540$

92
90
+ 134
316

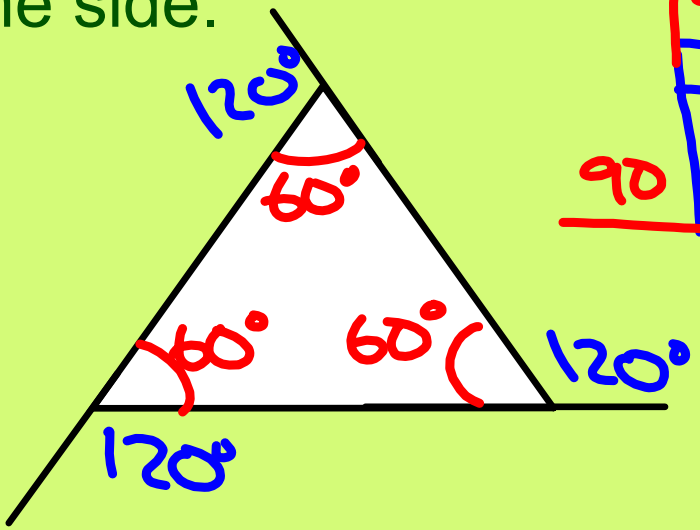
$540 - 316 = 224$

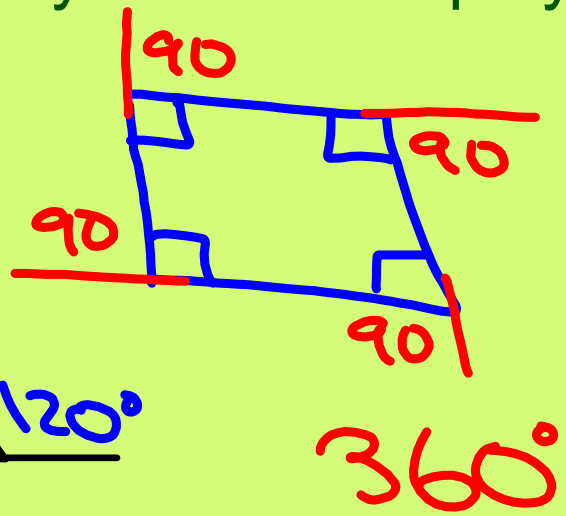
$224 \div 2 = 112$

Exterior Angles of Polygons

You can draw exterior angles at any vertex of a polygon by extending one side.

$$\begin{array}{r} 120 \\ 120 \\ +\,120 \\ \hline 360 \end{array}$$





Polygon Exterior Angle-Sum Theorem

The sum of the measures of the exterior angles of a convex polygon, one angle at each vertex, is 360°.

Find the measure of one interior and one exterior angle of each regular polygon.

decagon

$(10-2)180 = 1440$

$\frac{1440}{10} = 144°$ ← Int. Angle

$180 - 144 = 36°$ ← Ext. Angle

$\frac{360}{10} = 36$

25-gon

$(25-2)180$

$= \frac{4140}{25}$

$165.6°$ ← Int. Angle

$180 - 165.6 = 14.4°$ ← Ext.

Assignment:

Finish Concept 14 Workheet

- due Friday 12/6

(16) $(11-2)180$

$1620°$