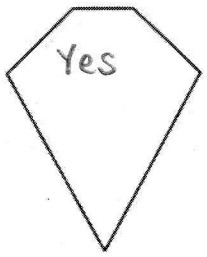
Name Answer Key Group _____ Date _____

Investigation 1 Review: The Family of Polygons

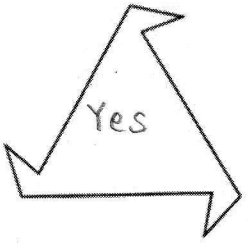
#7 **1.** Tell whether each figure is a polygon. Explain how you know.

Polygon: a closed figure with at least 3 line segments (none of which intersect).

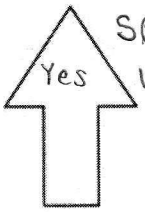
a.



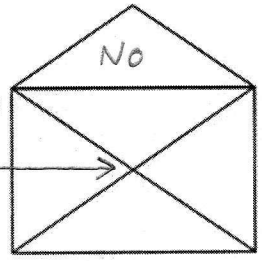
b.



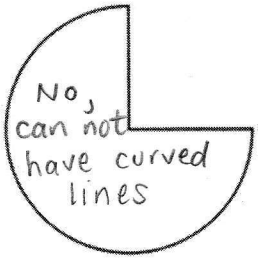
c.



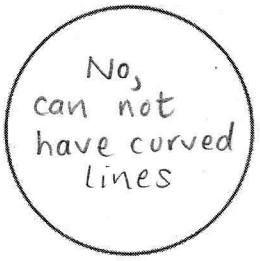
d.



e.



f.

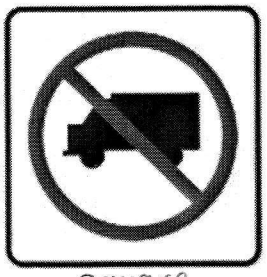


#7 **4.** Name the polygons used in these street and highway signs (ignore slightly rounded corners).

a.

pentagon

b.

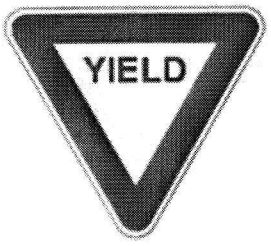


square

c.

square, rectangle

d.



triangle

e.

trapezoid

f.

rectangle

g.

triangle

h.

rectangle, triangle

i.

rectangle, octagon

#7 **65.** Which of the following statements are true? Be able to justify your answers. ★Refer to your quadrilateral graphic organizer★

a. All squares are rectangles. TRUE. A rectangle is a parallelogram with right angles.

b. No squares are rhombuses. FALSE. ALL squares are rhombuses because rhombuses are parallelograms with congruent sides.

c. All rectangles are parallelograms. TRUE. A parallelogram has 2 pairs of parallel sides.

d. Some rectangles are squares. FALSE. A square is a paralleogram with right angles AND congruent sides.

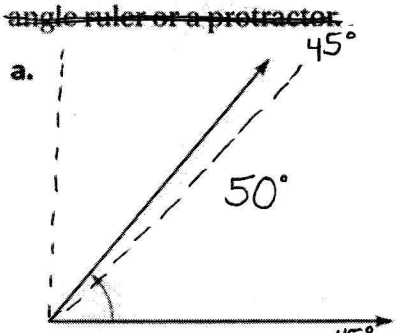
e. Some rectangles are trapezoids. FALSE. A trapezoid only has 1 pair of parallel sides.

f. No trapezoids are parallelograms. TRUE. A trapezoid has only 1 pair of parallel sides.

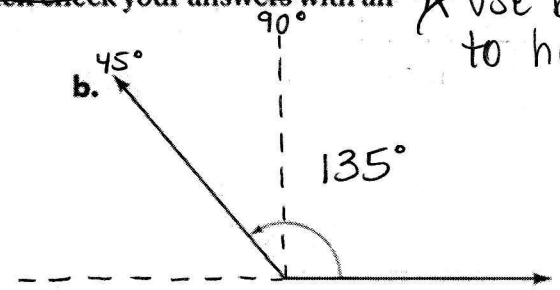
g. Every quadrilateral is a parallelogram, a trapezoid, a rectangle, a rhombus, or a square. All of the above are quadrilaterals, but there are other quadrilaterals not listed (trapezium, kite, etc)

#4 **31.** Estimate the measure of each angle, ~~then check your answers with an angle ruler or a protractor.~~ ★Use benchmark angles to help estimate.

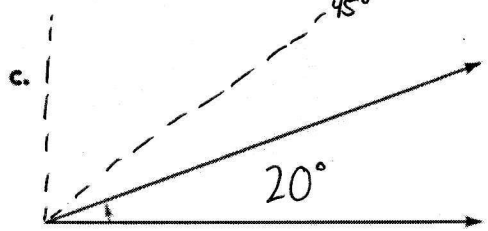
a.



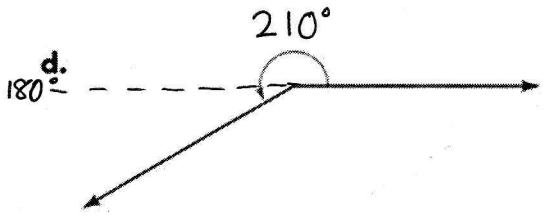
b.



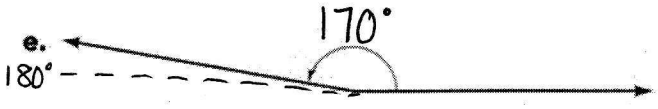
c.



d.



e.



#8

32. Draw an angle for each measure. Include an arc indicating the turn.

a. 45°

b. 25°

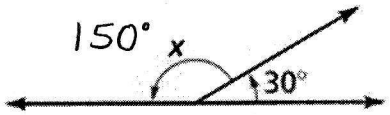
c. 180°

d. 200°

#9

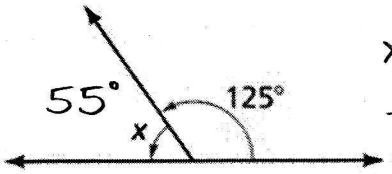
For Exercises 13–16, write an equation and find the measure of the angle labeled *x*, *without* measuring.

13.



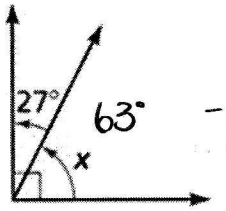
$x + 30 = 180$
$-30 \quad -30$
$x = 150$

14.



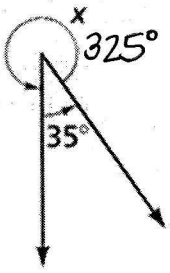
$x + 125 = 180$
$-125 \quad -125$
$x = 55$

15.



$27 + x = 90$
$-27 \quad -27$
$x = 63$

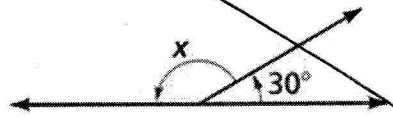
16.



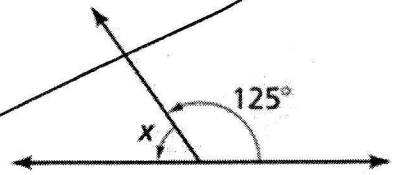
$x + 35 = 360$
$-35 \quad -35$
$x = 325$

For Exercises 13–16, write an equation and find the measure of the angle labeled *x*, *without* measuring.

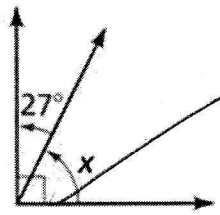
13.



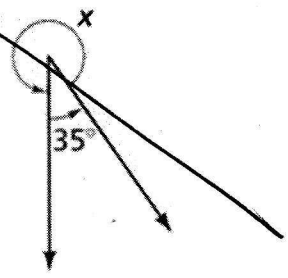
14.



15.

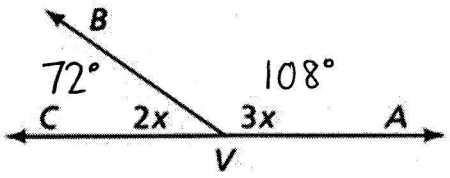


16.



#6, 9

56. Use the diagram below. Write an equation using the angle measures shown. Then, find the measures of $\angle AVB$ and $\angle BVC$.



$2x + 3x = 180$

$\frac{5x}{5} = \frac{180}{5}$

$x = 36$

$2x = 2(36)$

$72°$

$3x = 3(36)$

$108°$

#8

In Exercises 33–36, draw the polygons described. If there is more than one (or no) shape that you can draw, explain how you know that.

33. Draw a rectangle. Perimeter = 24 cm and side of 8 cm.

34. Draw a triangle. Side $\overline{AB} = 2$ in. Side $\overline{AC} = 1$ in. $\angle BAC = 75°$.

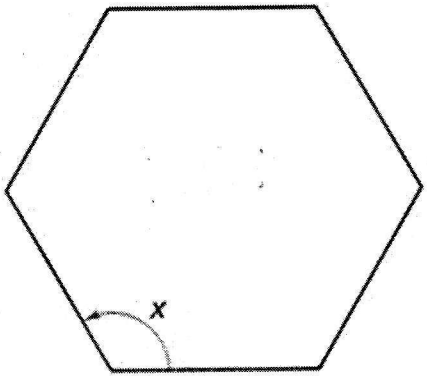
35. Draw a triangle. $\angle BAC = 75°$ and $\angle ACB = 75°$.

36. Draw a trapezoid $PQRS$. $\angle QPS = 45°$. $\angle RQP = 45°$. Side $\overline{PS} = 1$ in. Side $\overline{PQ} = 2$ in.

Investigation 2 Review: The Angle Connection

#2 **1. Without measuring, find the measure of the angle labeled x in each regular polygon.** $A = \frac{180(n-2)}{n}$ A = measure of each angle n = # of sides

a.



$n = 6$

$A = \frac{180(6-2)}{6}$

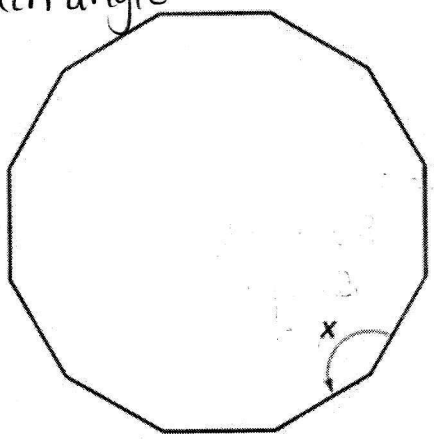
$A = \frac{180(4)}{6}$

$A = \frac{720}{6}$

$A = 120$

$X = 120°$

b.



$n = 12$

$A = \frac{180(12-2)}{12}$

$A = \frac{180(10)}{12}$

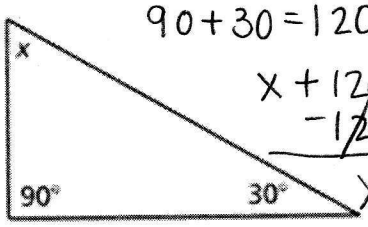
$A = \frac{1800}{12}$

$A = 150$

$X = 150°$

#9 **For Exercises 3–10, find the measure of each angle labeled x.**

3.



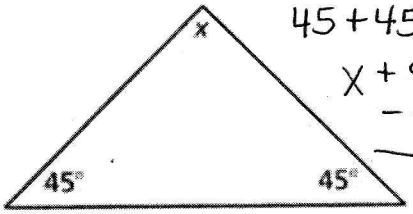
$90 + 30 = 120$

$x + 120 = 180$

$-120 \quad -120$

$X = 60°$

4.



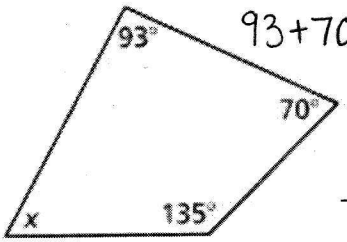
$45 + 45 = 90$

$x + 90 = 180$

$-90 \quad -90$

$X = 90°$

5.



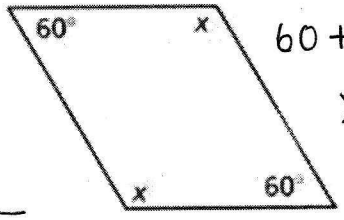
$93 + 70 + 135 = 298$

$x + 298 = 360$

$-298 \quad -298$

$X = 62°$

6.



$60 + 60 = 120$

$x + x + 120 = 360$

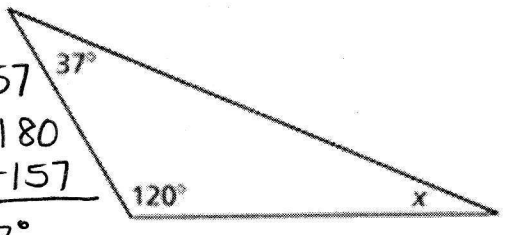
$2x + 120 = 360$

$-120 \quad -120$

$\frac{2x}{2} = \frac{240}{2}$

$x = 120°$

7.



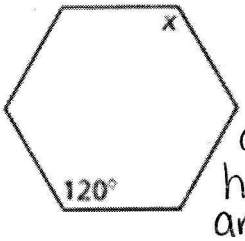
$37 + 120 = 157$

$x + 157 = 180$

$-157 \quad -157$

$X = 23°$

8. This figure is a regular hexagon.

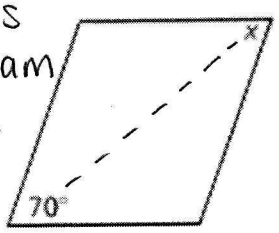


All angles within a regular polygon have the SAME angle measures.

$X = 120°$

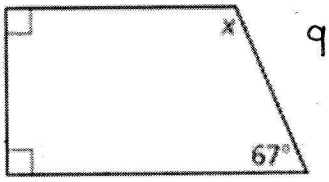
9. This figure is a parallelogram.

Opposite angles of a parallelogram are congruent.



$X = 70°$

10. This figure is a trapezoid.



$90 + 90 + 67 = 247$

$x + 247 = 360$

$-247 \quad -247$

$X = 113°$

12. The figure below is a regular dodecagon. It has 12 sides.

a. $S = 180(n-2)$

S = sum of the measures of the angles

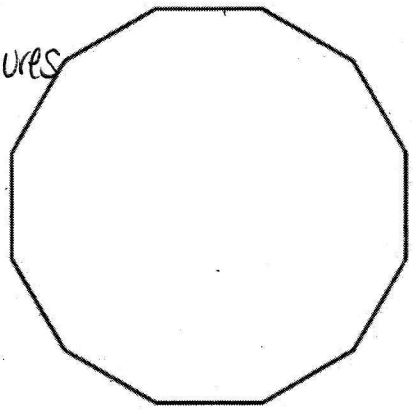
n = # of sides

$n = 12$

$S = 180(12-2)$

$S = 180(10)$

$S = 1800°$



$A = \frac{180(n-2)}{n}$

A = measure of each angle

n = # of sides

$n = 12$

$A = \frac{180(12-2)}{12}$

$A = \frac{180(10)}{12}$

$A = \frac{1800}{12}$

$A = 150°$

#1 **a.** What is the sum of the measures of the angles of this polygon? 1800°

#2 **b.** What is the measure of each angle? 150°

#3 **15.** Suppose the skaters complete one lap around a park that has the shape of a regular pentagon.

a. What is the sum of the angles through which they turn? 360°

b. How many degrees will the skaters turn if they go once around a regular hexagon? A regular octagon? A regular polygon with n sides? Explain.

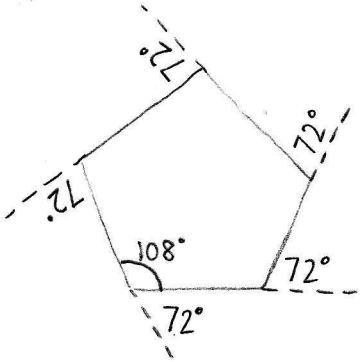
a. Regular pentagon: $n = 5$

$A = \frac{180(5-2)}{5}$

$A = \frac{180(3)}{5}$

$A = \frac{540}{5}$

$A = 108°$



$72° \cdot 5 \text{ turns} = 360°$

b. The sum of the exterior angles of ANY polygon is 360°.

Investigation 3 Review: Designing Triangles & Quadrilaterals

#5 For problems 1 – 4, explain whether or not the follow combination of sides would make a triangle and why. Triangle Inequality Theorem: the sum of the two shorter side lengths MUST be greater than the longest side length

1. **5, 5, 3**
   $3+5=8$ $8>5$ Yes, this will make a triangle.
2. **8, 8, 8**
   $8+8=16$ $16>8$ Yes, this will make a triangle.
3. **7, 8, 15**
   $7+8=15$ $15=15$ No, this will not make a triangle because, is SUM is not GREATER than the longest side length.
4. **5, 6, 10**
   $5+6=11$ $11>10$ Yes, this will make a triangle,
5. **From Exercises 1–4, which sets of side lengths can make each of the following shapes?**

   a. an equilateral triangle (all three sides are equal length) Triangle 2

   b. an isosceles triangle (two sides are equal length) Triangle 1

   c. a scalene triangle (no two sides are equal length) Triangle 4

   d. a triangle with at least two angles of the same measure Triangles 1 & 2

#7 For problems 10-13, explain whether or not the follow combination of sides would make a quadrilateral and why. The sum of three side lengths MUST be greater than the longest side length.

10. **5, 5, 8, 8**
    $5+5+8=18$ $18>8$ YES
11. **5, 5, 6, 14**
    $5+5+6=16$ $16>14$ YES
12. **8, 8, 8, 8**
    $8+8+8=24$ $24>8$ YES
13. **4, 3, 5, 14**
    $4+3+5=12$ $12<14$ NO
14. **From Exercises 10–13, which sets of side lengths can make each of the following shapes?**

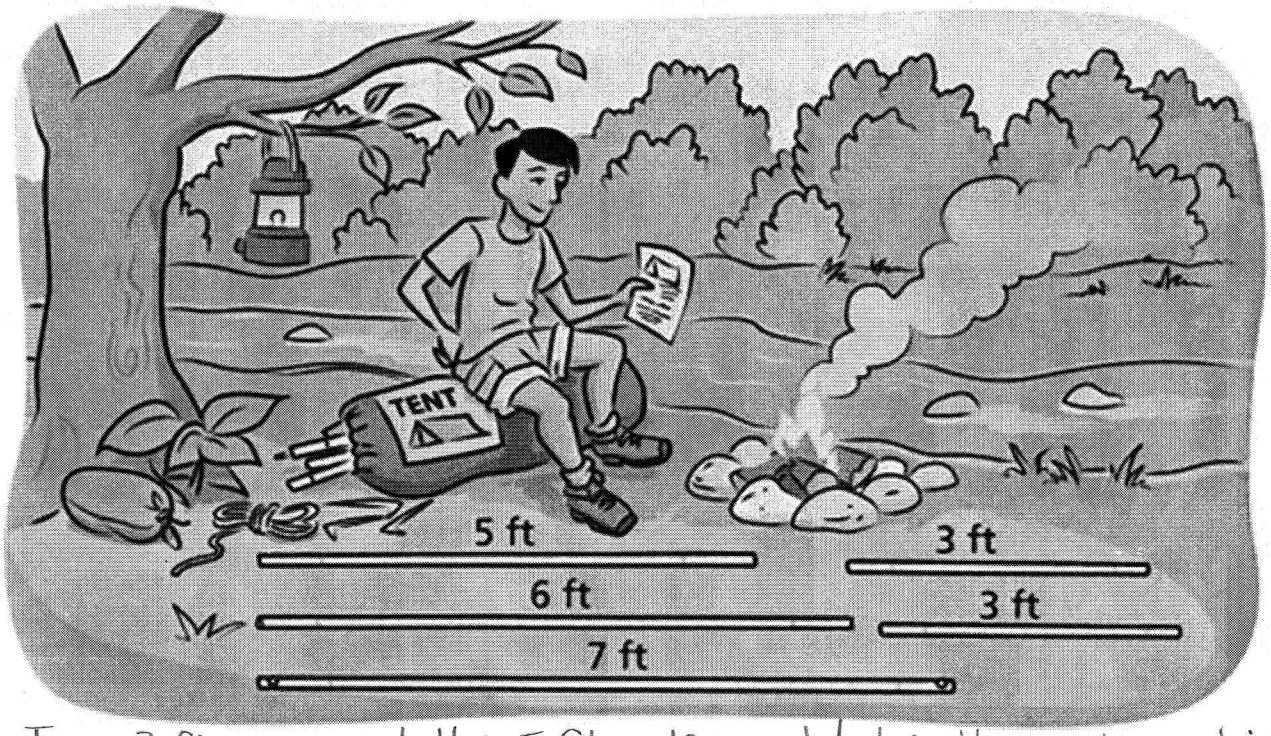
    a. a square 12

    b. a quadrilateral with all angles the same size 10 and 12

    c. a parallelogram 10 and 12

    d. a quadrilateral that is not a parallelogram 11

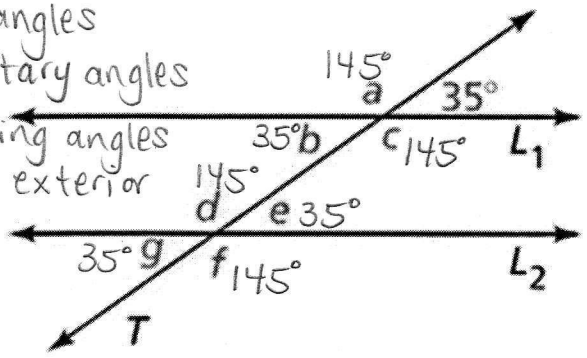
#5 **8.** Giraldo is building a tent. He has two 3-foot poles. He also has a 5-foot pole, a 6-foot pole, and a 7-foot pole. He wants to make a triangular-shaped doorframe for the tent using the 3-foot poles and one other pole. Which of the other poles could be used for the base of the door?



Two 3 ft poles and the 5 ft pole would be the only combination of poles that would create a triangle using the 3 ft. poles.

#6 **17.** In the diagram below, line T is a transversal to parallel lines L_1 and L_2.

∠b and 35° = vertical angles
∠a and 35° = supplementary angles
∠e and 35° = corresponding angles
∠g and 35° = alternate exterior angles



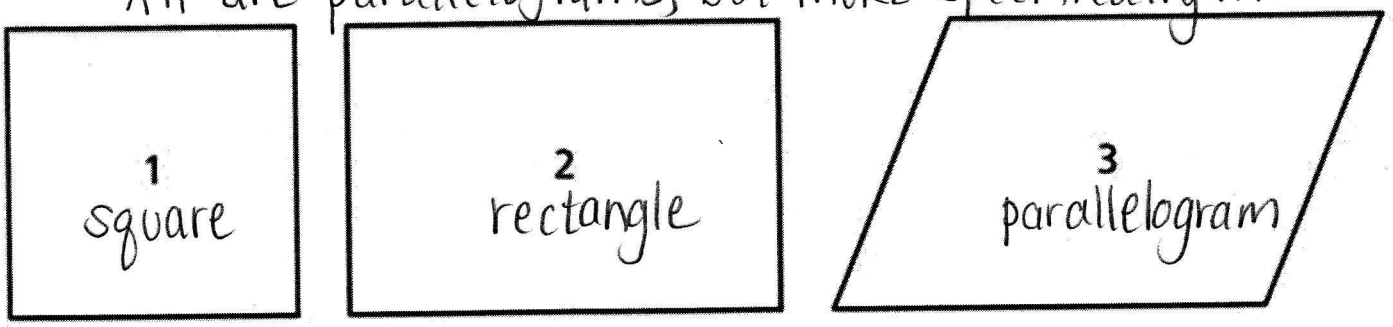
a. Find the degree measures of angles labeled a–g.

b. Name the pairs of opposite or vertical angles in the figure.

29. Compare the three quadrilaterals below.

#7

All are parallelograms, but MORE specifically...



a. How are all three quadrilaterals alike?

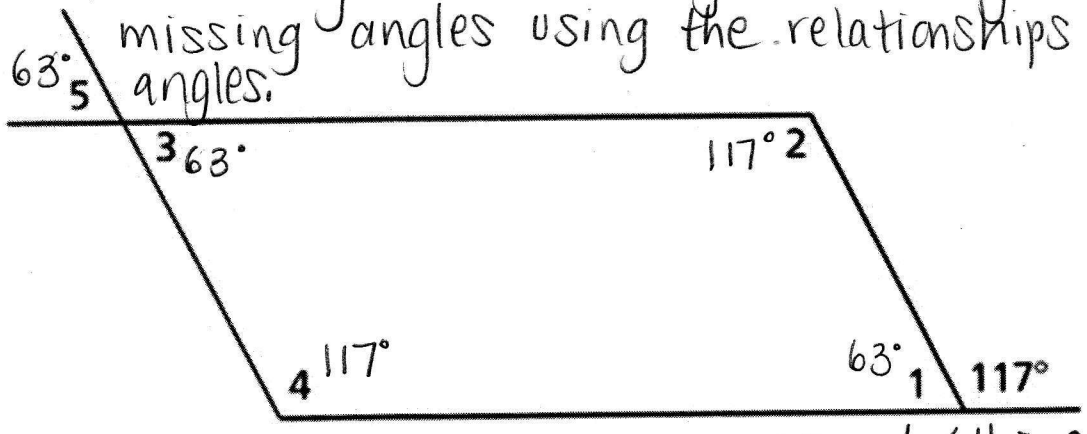
b. How does each quadrilateral differ from the other two?

a. All three quadrilaterals are parallelograms. Opposite sides are parallel and congruent. Opposite angles are congruent. Consecutive angles are supplementary (have a sum of 180°).

b. Quadrilateral 2 does not have equal side lengths, therefore it is not a square like quadrilateral 1. Quadrilateral 3 does not have four right angles and therefore is not a square or rectangle like quadrilaterals 1 & 2.

#6 **30. In the parallelogram, find the measure of each numbered angle.**

★ There are many different ways of solving for the missing angles using the relationships of the angles.



∠1 and 117° = supplementary angles

$X + 117 = 180$

$-117 \quad -117$

$X = 63°$

∠1 and ∠2 = consecutive angles

$X + 63 = 180$

$-63 \quad -63$

$X = 117°$

∠2 and ∠4 = opposite angles (congruent)

∠1 and ∠3 = opposite angles (congruent)

∠3 and ∠5 = vertical angles (congruent)