Name:_____

Monica

Geometry Period:_____

Date:_____

Outcome	Question #s
#01: Argues with different types of reasoning in order to prove or disprove a statement	2
#04: Be precise in calculating and applying the length and midpoint of a segment	4
#06: Graphically and algebraically discerns if lines are parallel or perpendicular on a coordinate plane and can identify the point of intersection of intersecting lines	4
#07: Identifies polygons precisely and can determine angle sums and missing angle measures	3, 7
#08: Concludes if two triangles are congruent and identifies corresponding parts	2
#10: Discerns and applies theorems and relationships about quadrilaterals and communicates those relationships	1, 2, 4, 5, 6

1) In the diagram below, quadrilateral $STAR$ is a rhombus with diagonals $\overline{SA}$ and $\overline{TR}$ intersecting at E. $ST = 3x + 30$, $SR = 8x - 5$, $SE = 3z$, $TE = 5z + 5$, $AE = 4z - 8$, $m\angle RTA = 5y - 2$, and $m\angle TAS = 9y + 8$. Find SR, RT, and $m\angle TAS$.
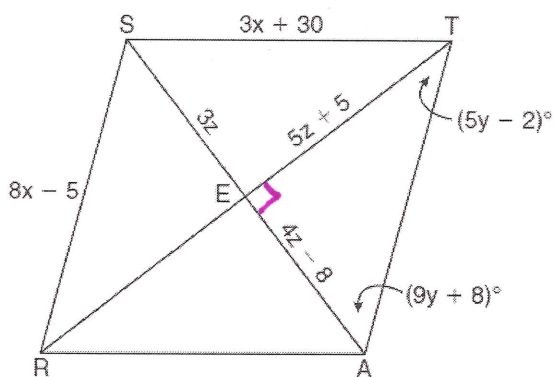
$$5y - 2 + 9y + 8 + 90 = 180$$

$$14y + 96 = 180$$

$$14y = 84$$

$$y = 6$$

$$\angle TAS = 9y + 8$$
$$= 9(6) + 8$$
$$= 54 + 8$$
$$\boxed{\angle TAS = 62}$$

$$3z = 4z - 8$$
$$-z = -8$$
$$z = 8$$

$$RT = 5z + 5 + 5z + 5$$
$$= 5(8) + 5 + 5(8) + 5$$
$$= 40 + 5 + 40 + 5$$
$$\boxed{RT = 90}$$

$$3x + 30 = 8x - 5$$
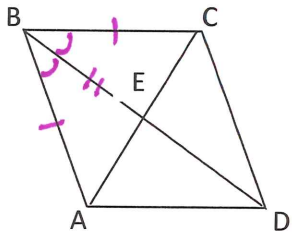$$30 = 5x - 5$$
$$35 = 5x$$
$$7 = x$$

$$SR = 8x - 5$$
$$= 8(7) - 5$$
$$= 56 - 5$$
$$\boxed{SR = 51}$$

2) Given: ABCD is a rhombus
   Prove: $\triangle AEB \cong \triangle CEB$

Statements	Reasons
1. ABCD is a rhombus	1. Given
2. $\overline{AB} \cong \overline{CB}$	2. Def. of a rhombus
3. $\angle ABE \cong \angle CBE$	3. The diagonals bisect the angles in a rhombus
4. $\overline{BE} \cong \overline{BE}$	4. Reflexive Property
5. $\triangle AEB \cong \triangle CEB$	5. SAS

3) The diagram below shows only part of a regular polygon. It is unknown how many sides the polygon has. If x + y = 312, how many sides must the polygon have?

$$x + y = 312$$
$$x + x = 312$$
$$2x = 312$$
$$x = 156$$

$$\frac{(n-2) \times 180}{n} = 156$$

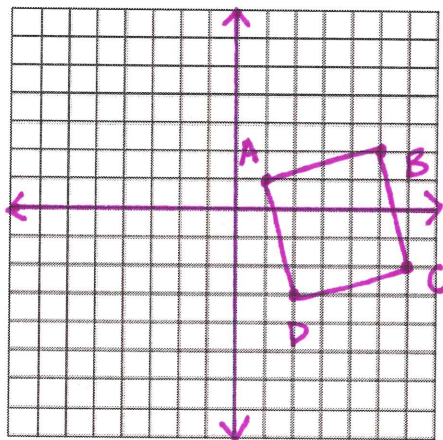$$(n-2) \times 180 = 156n$$

$$180n - 360 = 156n$$

$$-360 = -24n$$

$$15 = n$$

The polygon has 15 sides.

4) Quadrilateral ABCD has vertices A(1, 1), B(5, 2), C(6, -2), and D(2, -3). Use coordinate geometry to classify the quadrilateral using the most precise name possible. [Use of the grid is optional.]

$$AB = \frac{2-1}{5-1} = \frac{1}{4}$$

$$BC = \frac{-2-2}{6-5} = \frac{-4}{1} = -4$$

$$CD = \frac{-3--2}{2-6} = \frac{-1}{-4} = \frac{1}{4}$$

$$AD = \frac{-3-1}{2-1} = \frac{-4}{1} = -4$$

Since the adjacent sides have negative reciprocal slopes, all of the sides are $\perp$ (90° angles).

$$AB = \sqrt{(5-1)^2+(2-1)^2} = \sqrt{(4)^2+(1)^2} = \sqrt{16+1} = \sqrt{17}$$

$$BC = \sqrt{(6-5)^2+(-2-2)^2} = \sqrt{(1)^2+(-4)^2} = \sqrt{1+16} = \sqrt{17}$$

$$CD = \sqrt{(6-2)^2+(-2--3)^2} = \sqrt{(4)^2+(1)^2} = \sqrt{16+1} = \sqrt{17}$$

$$AD = \sqrt{(1-2)^2+(1--3)^2} = \sqrt{(-1)^2+(4)^2} = \sqrt{1+16} = \sqrt{17}$$

Since all of the sides are $\perp$, and all 4 sides are $\cong$, figure ABCD is a square.

5) Identify the statements below as true or false:

a) __False__ The diagonals in a parallelogram are congruent.

b) __True__ The diagonals in a square bisect the angles.

c) __False__ A trapezoid has one pair of congruent sides.

d) __True__ The opposite angles in a rhombus are congruent.

e) __True__ The opposite sides in a rectangle are congruent.

f) __True__ The diagonals in an isosceles trapezoid are congruent.

g) __False__ All parallelograms are rectangles.

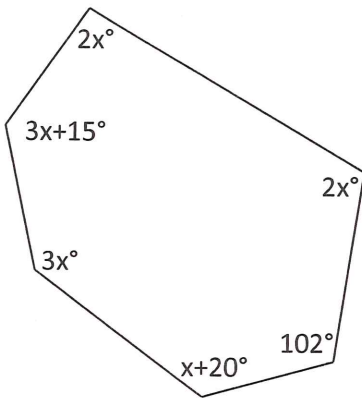6) The measures of two consecutive angles are in the ratio of 3:7. What is the measure of the smaller angle?

$$3x + 7x = 180$$
$$10x = 180$$
$$x = 18$$

$$3(18) = 54°$$

7) What is the value of x in the hexagon below? (Note: Figure not drawn to scale.)

$$(n-2) \times 180$$
$$(6-2) \times 180$$
$$4 \times 180$$
$$720°$$

$$2x + 3x + 15 + 3x + x + 20 + 102 + 2x = 720$$
$$11x + 137 = 720$$
$$11x = 583$$
$$\boxed{x = 53}$$