Unit 2: Congruence

ADVANCED

Name: _____ Date: _____

Show all work. Give each answer as an exact value: a number, a coordinate pair like (3, -4), or "yes"/"no". Use the transformation and triangle-congruence rules for this unit.

1. Triangle ABC is mapped by the composition: first translate by the vector (3, -5), then reflect the result over the x-axis. Vertex A is at (-4, 7). Find the coordinates of A' after BOTH transformations are applied in order.

Answer: _____

2. A rigid motion first reflects a point over the y-axis, then rotates the result 90° clockwise about the origin. Point P is at (3, 5). Find the coordinates of the final image P'' after both steps.

Answer: _____

3. Triangle DEF is congruent to its image under a 180° rotation about the center point (1, -1). Vertex D is at (4, 3). Find the coordinates of the image D'.

Answer: _____

4. A figure is reflected over the vertical line x = 3. One vertex is located at (9, 4). Find the coordinates of that vertex's image.

Answer: _____

5. A glide reflection reflects a point over the x-axis and then translates it by the vector (6, 0). The point (2, -3) is transformed. Find the coordinates of its final image.

Answer: _____

6. Triangle GHI is congruent to triangle JKL by ASA, so corresponding sides are equal. Side GH = 3x - 7 and its corresponding side JK = 2x + 5. First solve for x, then give the numeric length of side GH.

Answer: _____

7. Two triangles are congruent, so a pair of corresponding angles are equal: one measures (2x + 15)° and the other measures (4x - 9)°. Solve for x.

Answer: _____

8. A triangle with side lengths 2x + 1, x + 4, and 3x - 2 is congruent to a triangle whose perimeter is 33. Solve for x.

Answer: _____

9. A point is reflected through the center point (2, -1) (equivalently, rotated 180° about that point). The original point is (8, 5). Find the coordinates of its image.

Answer: _____

10. Triangle MNP is congruent to triangle QRS. In triangle MNP, angle M = 47° and angle N = 68°. By CPCTC, angle S corresponds to angle P. Find the measure, in degrees, of angle S.

Answer: _____

11. Two triangles are proven congruent by SAS. A pair of corresponding included sides are equal: one is $5x - 3$ and the other is $3x + 11$. Solve for x.

Answer: _____

12. A right triangle is congruent to another right triangle by HL. The hypotenuse measures 17 and one leg measures 8. Find the exact length of the other leg.

Answer: _____