Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour 1. 2. 3. 4. 5

**Transformations with Matrices**

**Use a matrix to find the coordinates of the vertices of the image of each figure under the given translations.**

1. STU with S(6, 4), T(9, 7) and U(14, 2); (x, y) (x – 4, y + 3)

2. GHI with G(-5, 0), H(-3, 6) and I(-2, 1); (x, y) (x + 2, y + 6)

3. KLM with K(-7, -3), L(4, 9) and M(9, -6); (x, y) (x – 7, y + 2)

4. parallelogram ABCD with A(-4, 3), B(-2, 8), C(3, 10), and D(1, 5); (x, y) (x + 3, y - 9)

**Use scalar multiplication to find the coordinates of the vertices of each figure for a dilation centered at the origin with the given scale factor.**

5. DEF with D(2, 1), E(5, 4) and F(7, 2); r = 4

6. quadrilateral WXYZ with W(-9, 6), X(-6, 3), Y(3, 12) and Z(-6, 15); r =

7. quadrilateral HIJK with H(-2, 3), I(2, 6), J(8, 3) and K(3, -4); r =

8. pentagon DEFGH with D(-8, -4), E(-8, 2), F(2, 6), G(8, 0) and H(4, -6); r =

**Use a matrix to find the coordinates of the vertices of the image of each figure under the given reflection.**

9. MNO with M(-5, 1), N(-2, 3) and O(2, 0); y -axis

10. quadrilateral ABCD with A(3, 1), B(6, -2), C(5, -5), and D(1, -6); x-axis

11. QRS with Q(-5, -4), R(-1, -1) and S(2, -6); x -axis

12. quadrilateral VXYZ with V(-4, -2), X(-3, 4), Y(2, 1) and Z(4, -3); y = x

**Use a matrix to find the coordinates of the vertices of the image of each figure under the given rotation.**

13. RST with R(-2, -2), S(-3, 3) and T(2, 2); 90 counterclockwise

14. parallelogram LMNP with L(3, 4), M(7, 4), N(9, -3), and P(5, -3); 180 counterclockwise

15. parallelogram EFGH with E(-5, -4), F(-3, -1), G(5, -1) and H(3, -4); 90 counterclockwise

16. quadrilateral PSTU with P(-3, 5), S(2, 6), T(8, 1) and U(-6, -4); 270 counterclockwise

17. **Forestry** A research botanist mapped a section of forested land on a coordinate grid to keep track of endangered plants in the region. The vertices of the map are A(-2, 6), B(9, 8), C(14, 4) and D(1, -1). After a month, the botanist has decided to decrease the research area to of its original size. If the center for the reduction is O(0, 0), what are the coordinates of the new research area?