Write rules representing the following:

1. $r_{x-axis} \circ T_{-3,\,1}$
2. $R_{90°} \circ r_{y=x}$
3. $r_{x-axis} \circ r_{y=axis}$
4. $T_{5,\,-2} \circ R_{180°}$
5. $R_{270°} \circ r_{y-axis}$

Write the rules that represent the composite transformations given below:

6. translate left 2 units, then reflect over the x-axis

7. rotate 90 degrees, then translate up 4 units

8. reflect over the line y = x, then rotate 180 degrees

9. translate down 3 and right 5 units, then reflect over the y-axis

10. translate 2 units up and 1 unit left, then dilate with a scale factor of 2 centered at the origin

Given the rule, describe the composition (in words) and give the composition notation that describes the composite transformations below:

11. $(x,\,y) \longrightarrow (-(x+2),\,(y-3))$
12. $(x,\,y) \longrightarrow (-(y+5),\,(x+8))$
13. $(x,\,y) \longrightarrow (-(x+7),\,-y)$

14. If the domain of the coordinate transformation $f(x,\,y) = (3y-6,\,3x+4)$ is (3, -2), (-4, 5), and (2, 0), what is the range?

15. If the range of the coordinate transformation $f(x,\,y) = (-x+3,\,y+2)$ is (7, 2), (-4, 8), and (5, -6), what is the domain?

Answer Key:

1. $(x, y) \longrightarrow (x-3, y+1) \rightarrow (x-3, -(y+1))$

2. $(x, y) \longrightarrow (y, x) \rightarrow (-x, y)$

3. $(x, y) \longrightarrow (-x, y) \rightarrow (-x, -y)$

4. $(x, y) \longrightarrow (-x, -y) \rightarrow (-x + 5, -y - 2)$

5. $(x, y) \longrightarrow (-x, y) \rightarrow (y, x)$

6. $(x, y) \longrightarrow (x-2, y) \rightarrow (x - 2, -y)$

7. $(x, y) \longrightarrow (-y, x) \rightarrow (-y, x+4)$

8. $(x, y) \longrightarrow (y, x) \rightarrow (-y, -x)$

9. $(x, y) \longrightarrow (x+5, y-3) \rightarrow (-(x+5), y-3)$

10. $(x, y) \longrightarrow (x-1, y+2) \rightarrow (2(x-1), 2(y+2) \rightarrow (2x-2, 2y+4)$

11. translate right 2 and down 3, followed by a reflection across the y-axis

    $r_{y\text{-axis}} \circ T_{2,-3}$

12. translate right 8 and up 5, followed by a rotation of 90 degrees centered at the origin

    $R_{90 \text{ degrees}} \circ T_{8,5}$

13. translate right 7, followed by a rotation of 180 degrees centered at the origin

    $R_{180 \text{ degrees}} \circ T_{7,0}$