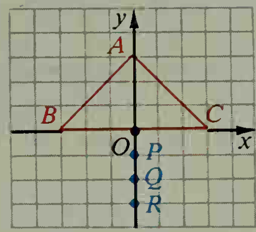
Self-Test 2

For Exercises 1–6, refer to the figure.



1. $R_x \circ \mathcal{R}_{O,\,90}: B \to \underline{\quad ? \quad}$

2. $R_x \circ H_O: A \to \underline{\quad ? \quad}$

3. $\mathcal{R}_{O,\,110} \circ \mathcal{R}_{O,\,70}: C \to \underline{\quad ? \quad}$

4. $D_{O,\,\frac{1}{2}} \circ D_{R,\,\frac{1}{2}}: P \to \underline{\quad ? \quad}$

5. What is the symmetry line of $\triangle ABC$?

6. Does $\triangle ABC$ have point symmetry?

7. For any transformation T, $T^{-1} \circ T: P \to \underline{\quad ? \quad}$.

8. The composite of any transformation T and the identity is $\underline{\quad ? \quad}$.

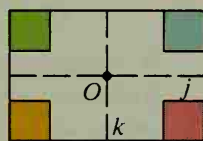
9. If line a is parallel to line b, then the composite $R_a \circ R_b$ is a $\underline{\quad ? \quad}$.

10. Give the inverse of each transformation.

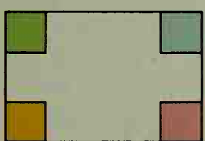
a. $D_{O,\,5}$ **b.** $\mathcal{R}_{O,\,-70}$ **c.** R_y **d.** $S:(x,\ y) \to (x + 2,\ y - 3)$

11. How many lines of symmetry does a regular hexagon have?

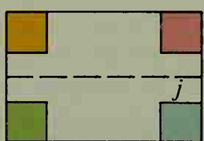
Extra — *Symmetry Groups*



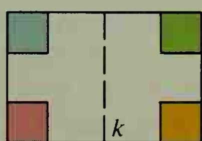
Cut out a cardboard or paper rectangle and color each corner with a color of its own on both front and back. Also on the front and back draw symmetry lines j and k and label symmetry point O. The rectangle has four symmetries: I, R_j, R_k, and H_O. The effect of each of these on the original rectangle is shown below.



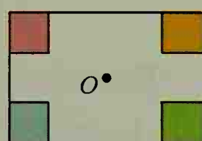
Effect of I: Rectangle unchanged



Effect of R_j



Effect of R_k



Effect of H_O

Our goal is to see how the four symmetries of the rectangle combine with each other. For example, if the original rectangle is mapped first by R_j and then by H_O, the images look like this: