1. Suppose you are given points $P, X, X'$, and $S$ such that $X'$ is the image of $X$ under a rotation about $P$. Explain how a compass and straightedge can be used (without a protractor) to construct the image of $S$ under the same rotation.

In Exercises 2–3, $X'$ is the image of $X$ under a rotation about $P$. Use a compass and straightedge to construct the image of $S$ under the same rotation.

2. $X'$

3. $X'$

In Exercises 4–7, refer to the diagram, where $Q'$ and $R'$ are the images of $Q$ and $R$ after a $90^\circ$ counterclockwise rotation about $P$.

4. Find the coordinates of $Q'$ in terms of $a, b, x_0$, and $y_0$.

5. Find the coordinates of $R'$ in terms of $a, b, x_0$, and $y_0$.

6. If the point $(5, 3)$ is rotated $90^\circ$ counterclockwise about $(0, 0)$, what are the coordinates of the image point?

7. If the point $(2, -5)$ is rotated $90^\circ$ counterclockwise about $(-3, 7)$, what are the coordinates of the image point?

In Exercises 8–15, determine whether the polygon has rotational symmetry. If it does, describe the rotations that map the polygon onto itself.

8. equilateral triangle

9. square

10. regular pentagon

11. regular hexagon

12. rhombus (not a square)

13. rectangle (not a square)

14. kite

15. isosceles trapezoid