35. a. On the same axes, graph

$$y = \frac{1}{2}x - 2, \quad y = -2x + 3, \quad \text{and} \quad y = 3x + 8.$$

b. Find the coordinates of the three points where the lines intersect.

c. Find the area of the triangle determined by the three lines.

36. Find the area of the region inside the circle $x^2 + y^2 = 2$ *and* above the line $y = 1$.

C **37.** Use algebra to find each point at which the line $x - 2y = -5$ intersects the circle $x^2 + y^2 = 25$. Graph both equations to verify your answer.

38. a. Verify that the point $P(4, -2)$ is on the line $2x - y = 10$ and on the circle $x^2 + y^2 = 20$.

b. Show that the segment joining the center of the circle to P is perpendicular to the line.

c. What do parts (a) and (b) tell you about the line and the circle?

39. Graph each equation.

a. $|x| = |y|$ **b.** $|x| + |y| = 6$ **c.** $|x| + 2|y| = 4$

Explorations

These exploratory exercises can be done using a graphing calculator.

Graph the lines $y = 2x$, $y = 2x + 1$, and $y = 2x + 3$ on the same screen.

What do you notice about these lines?

What theorem does this illustrate?

Use what you have observed to write an equation of the line whose y-intercept is 7 and that is parallel to $y = 2x$.

Graph the lines $y = 2x$ and $y = -\frac{1}{2}x$ on the same screen.

Graph the lines $y = \frac{2}{3}x$ and $y = -\frac{3}{2}x$ on the same screen.

What do you notice about both pairs of lines?

What theorem does this illustrate?

Use what you have observed to write an equation of the line through the origin that is perpendicular to $y = \frac{4}{5}x$.

Challenge

Draw segments that divide an obtuse triangle into acute triangles.