

## Section 1.2

### Finding Intercepts

- To find  $x$ -intercepts, let  $y$  be zero and solve the equation for  $x$ .
- To find  $y$ -intercepts, let  $x$  be zero and solve the equation for  $y$ .

### Graphical Tests for Symmetry

- A graph is **symmetric with respect to the  $x$ -axis** if, whenever  $(x, y)$  is on the graph,  $(x, -y)$  is also on the graph.
- A graph is **symmetric with respect to the  $y$ -axis** if, whenever  $(x, y)$  is on the graph,  $(-x, y)$  is also on the graph.
- A graph is **symmetric with respect to the origin** if, whenever  $(x, y)$  is on the graph,  $(-x, -y)$  is also on the graph.

### Algebraic Tests for Symmetry

- The graph of an equation is symmetric with respect to the  $x$ -axis if replacing  $y$  with  $-y$  yields an equivalent equation.
- The graph of an equation is symmetric with respect to the  $y$ -axis if replacing  $x$  with  $-x$  yields an equivalent equation.
- The graph of an equation is symmetric with respect to the origin if replacing  $x$  with  $-x$  and  $y$  with  $-y$  yields an equivalent equation.

### Standard Form of the Equation of a Circle

The point  $(x, y)$  lies on the circle of radius  $r$  and center  $(h, k)$  if and only if

$$(x - h)^2 + (y - k)^2 = r^2$$

### Problems

**Problem 1.** Let  $y = x^2 - 3x + 2$ . Determine whether  $A(2, 0)$ ,  $B(-2, 8)$  lies on the graph of  $y$ .

**Problem 2.** Find the  $x$ - and  $y$ -intercepts of the graph of the equation

a)  $y = \sqrt{x + 4}$

b)  $y = x^4 - 25$

**Problem 3.** Use algebraic tests to check for symmetry with respect to both axes and the origin.

a)  $x - y^2 = 0$

b)  $y = \frac{1}{x^2+1}$

c)  $xy = 4$

**Problem 4.** Use symmetry to sketch the graph of the equation

a)  $y = x^2$

b)  $y = \frac{1}{x}$

c)  $x = y^2 - 2$

**Problem 5.** Write the standard form of the equation of the circle with the given characteristics

a) Center:  $(0, 0)$ ; radius: 5

b) Center:  $(-7, -4)$ ; radius: 7

**Problem 6.** Find the center and the radius of the circle, and sketch its graph.

a)  $x^2 + y^2 = 16$

b)  $(x - 1)^2 + (y + 2)^2 = \frac{16}{9}$

Homework: Read section 1.2, do # 9, 17, 20, 29, 37, 51, 55, 73, 75, 81 (the quiz for this section will be similar to these problems)