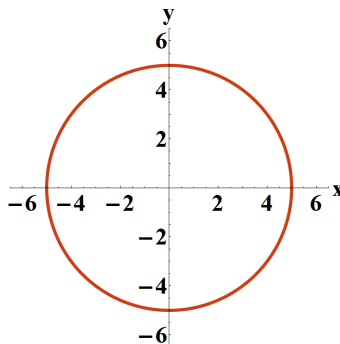


## Discovery Exercise for Implicit Differentiation

The equation  $x^2 + y^2 = 25$  describes a circle with radius 5 centered on the origin.



Answer questions 1–6 by looking at the picture. (No algebra should be required.)

1. What is the slope of this curve at the point  $(0, 5)$ ?
2. What is the slope of this curve at the point  $(5, 0)$ ?
3. What is the slope of this curve approaching as you approach the point  $(5, 0)$  from above?

*See Check Yourself #21 at [felderbooks.com/checkyourself](http://felderbooks.com/checkyourself)*

4. What is the slope of this curve approaching as you approach the point  $(5, 0)$  from below?
5. What is the slope of this curve at the point  $(5/\sqrt{2}, 5/\sqrt{2})$ ?
6. What is the slope of this curve at the point  $(5/\sqrt{2}, -5/\sqrt{2})$ ?

For questions 7–10, *approximate* the answers by looking at the picture. No two of your answers should be the same.

7. What is the slope of this curve at the point  $(4, 3)$ ?
8. What is the slope of this curve at the point  $(3, 4)$ ?
9. What is the slope of this curve at the point  $(4, -3)$ ?
10. What is the slope of this curve at the point  $(3, -4)$ ?
11. You can write the slope of this curve as a function of  $x$  and  $y$ . Guess at such a function for this curve. Your function  $m(x, y)$  should exactly match your answers to questions 1–6, and should approximately match your answers to questions 7–10.