SOLUTION Figure 18 shows computer-drawn graphs for various values of c. For $c > 1$ there is a loop that decreases in size as c decreases. When $c = 1$ the loop disappears and the curve becomes the cardioid that we sketched in Example 7. For c between 1 and $\frac{1}{2}$ the cardioid's cusp is smoothed out and becomes a "dimple." When c decreases from $\frac{1}{2}$ to

□ In Exercise 55 you are asked to prove analytically what we have discovered from the graphs in

21–26 □ Find a polar equation for the curve represented by the given Cartesian equation.

21. $y = 5$ $r\sin\theta = 5$ **22.** $y = 2x - 1$

23. $x^2 + y^2 = 25$ **24.** $x^2 = 4y$

(b) From Figure 18 it appears that the limaçon loses its dimple when $c = \frac{1}{2}$. Prove this.

56. Match the polar equations with the graphs labeled I–VI. Give reasons for your choices. (Don't use a graphing device.)