

14.1, number 15: **Sketch the level sets**  $f(x, y) = c$  **for**  $f(x, y) = xy$  **and**  $c$  **equals**  $-9, -4, -1, 0, 1, 4, 9$ .

**Answer:**

The level set  $xy = 0$  is the union of the  $x$ -axis and the  $y$ -axis.

The level sets  $xy = 1$ ,  $xy = 4$ , and  $xy = 9$  are hyperbolas in the first and third quadrants. Each of these hyperbolas is asymptotic to the  $x$ -axis and the  $y$ -axis.

The level sets  $xy = -1$ ,  $xy = -4$ , and  $xy = -9$  are hyperbolas in the second and fourth quadrants. Each of these hyperbolas is asymptotic to the  $x$ -axis and the  $y$ -axis.

There is a picture on the next page.

Picture 14.1 Number 15

