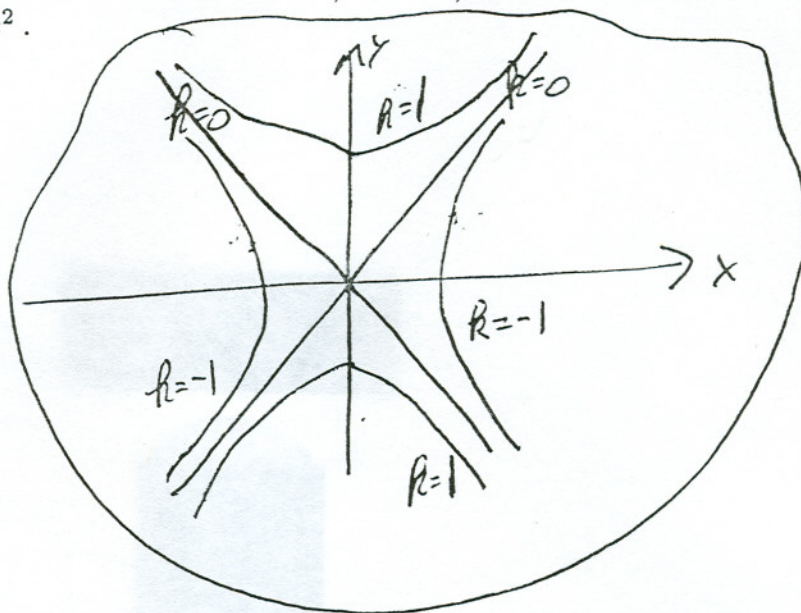


3. Draw and label the level sets of levels $k = -1$, $k = 0$, and $k = 1$ for the function $f(x, y) = y^2 - x^2$.

$k = -1$ $-1 = y^2 - x^2$
 $1 = x^2 - y^2$ hyperbolas

$k = 0$ $x = y$ or $x = -y$ 2 lines

$k = 1$ $1 = y^2 - x^2$
 hyperbolas



4. Let $f(x, y) = xe^{\frac{y}{x}}$. Find f_x and f_y .

$$f_x = xe^{\frac{y}{x}} \left(-\frac{y}{x^2}\right) + e^{\frac{y}{x}}$$

$$f_y = xe^{\frac{y}{x}} \frac{1}{x}$$