

## Exercise 37

In Exercises 29–40, test for symmetry with respect to each axis and to the origin.

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

### Solution

Replacing  $x$  with  $-x$  changes the equation, so there's no symmetry with respect to the  $y$ -axis.

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

Replacing  $y$  with  $-y$  changes the equation, so there's no symmetry with respect to the  $x$ -axis.

$$-y = \frac{x}{x^2 + 1} \rightarrow y = -\frac{x}{x^2 + 1}$$

Replacing  $x$  with  $-x$  and  $y$  with  $-y$  does not change the equation, so there is symmetry with respect to the origin.

$$-y = \frac{-x}{(-x)^2 + 1} \rightarrow -y = \frac{-x}{x^2 + 1} \rightarrow y = \frac{x}{x^2 + 1}$$

