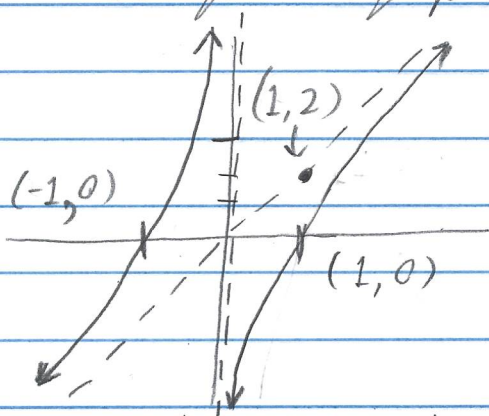


Exercise 4.3.29 For the graph given below, find:

- The domain and range,
- The intercepts, if any,
- Horizontal asymptotes, if any,
- Vertical asymptotes, if any, and
- oblique asymptotes, if any.



Solution

(a) We see from the graph that the domain is  $(-\infty, 0) \cup (0, \infty)$  and the range is  $\mathbb{R} = (-\infty, \infty)$ .

(b) The  $x$ -intercepts are  $x = -1$  and  $x = 1$ . There are no  $y$ -intercepts.

(c) There is no horizontal asymptote.

(d) There is a vertical asymptote of  $x = 1$ .

(e) The line passing through points  $(0, 0)$  and  $(1, 2)$  is an oblique asymptote. The slope is  $m = (y_2 - y_1) / (x_2 - x_1) = ((2) - (0)) / ((1) - (0)) = 2$ .

By the point slope formula, the

oblique asymptote is  $y - (0) = 2(x - (0))$  or  $y = 2x$ .

□