

Exercise 16

For the following exercises, find the domain, range, and all zeros/intercepts, if any, of the functions.

$$h(x) = \frac{3}{x^2 + 4}$$

Solution

$h(x)$ is a rational function, so the domain is the set of all x except the values where the denominator is zero.

$$x^2 + 4 \neq 0$$

$$x^2 \neq -4$$

Since there's no real value of x that gives $x^2 = -4$, the domain is $\{x \mid -\infty < x < \infty\}$. The largest value of $h(x)$ occurs when the denominator is smallest, $h(0) = 3/4$, and $h(x)$ gets closer and closer to zero as x gets larger and larger. The range is then $\{y \mid 0 < y \leq 3/4\}$. The one y -intercept is $(0, 3/4)$. There are no zeros because the numerator is never zero. Below is a graph of $h(x)$ versus x to confirm these results.

