

Starter $f(x) = \sqrt{x-4}$

Domain: $[4, \infty)$

Range: $[0, \infty)$

9.4 Key Features

- Domain ✓
- Range ✓
- Increasing ✓
- Decreasing ✓
- Local Max ✓
- Local Min ✓

Odd, even, neither
 ✓ Vertical & Horizontal Asymptotes

Domain:

$$g(x) = \frac{x}{x^2 - 3x} = \frac{x}{x(x-3)}$$

$x \neq 0, 3$

$(-\infty, 0) \cup (0, 3) \cup (3, \infty)$

Range: $(-\infty, 0) \cup (0, \infty)$

Asymptotes:

Vertical - Can't have zero in the Denominator

$y = \frac{1}{x-4}$ Vertical Asymptote $x = 4$

Asymptotes -

Horizontal - Check degree of the top & bottom

$y = \frac{1}{x-4}$ degree top less than degree bottom $y = 0$

$y = \frac{2x}{x-4}$ degree same on Top & bottom $y = 2$

$f(x) = \frac{3x}{2x-1}$

Vertical + Horizontal Asymptotes

Vertical $x = \frac{1}{2}$

Horizontal $y = \frac{3}{2}$

Domain $(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

Range $(-\infty, \frac{3}{2}) \cup (\frac{3}{2}, \infty)$

$f(x) = |x| + 2$
 Increasing $(0, \infty)$
 Decreasing $(-\infty, 0)$

$f(x) = 2x^3 - x^2 + 1$
 increasing: $(-\infty, -25)$ $(5, \infty)$
 constant (flat): $(-25, 5)$

$y = |x - 3| + 2$

Parent Function -

Odd

$y = x^3$

Symmetric to the Origin

Even

$y = x^2$

Symmetric to the Y-axis

$y = x^2 - 7$

Even

$y = x^2 + x - ?$

Neither

$y = |x| + 2$

Even

$y = |x + 1|$

Neither

$y = x^3 + x + 1$

Neither

Neither

$y = (x + 2)^3$

Neither