

Identify the key information for the following rational functions, then graph.

1.) $f(x) = \frac{x-4}{-4x-16}$ $f(x) = \frac{x-4}{-4(x+4)}$

Vertical Asymptote: $x = -4$

Horizontal Asymptote: $y = -1/4$

Hole(s): none

Domain: $(-\infty, -4) \cup (-4, \infty)$

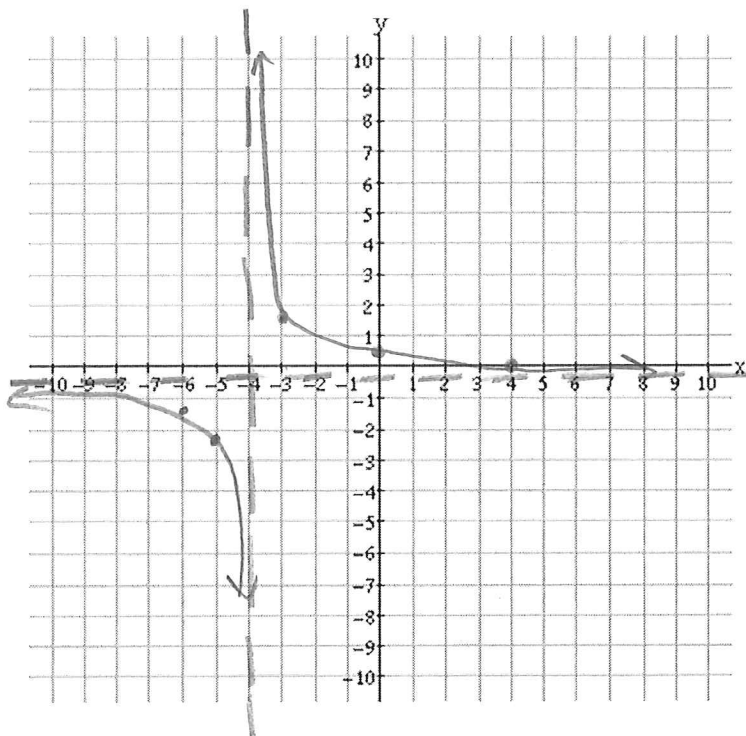
Range: $(-\infty, -1/4) \cup (-1/4, \infty)$

x-intercept(s): $(4, 0)$

y-intercept: $(0, 1/4)$

End Behavior: As $x \rightarrow -\infty, f(x) \rightarrow -1/4$

As $x \rightarrow \infty, f(x) \rightarrow -1/4$



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

Vertical Asymptote: $x = 1$ $x = -1$

Horizontal Asymptote: $y = 0$

Hole(s): none

Domain: $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

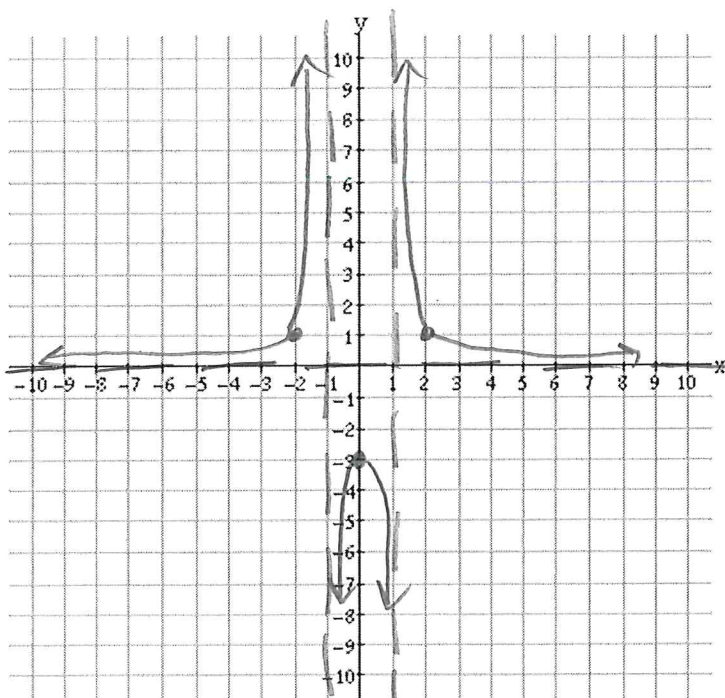
Range: $(-\infty, -3] \cup (0, \infty)$

x-intercept(s): none

y-intercept: $(0, -3)$

End Behavior: As $x \rightarrow -\infty, f(x) \rightarrow 0$

As $x \rightarrow \infty, f(x) \rightarrow 0$



3.) $f(x) = \frac{-4}{x^2 - 3x}$ $f(x) = \frac{-4}{x(x-3)}$

Vertical Asymptote: $x=0$ $x=3$

Horizontal Asymptote: $y=0$

Hole(s): none

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

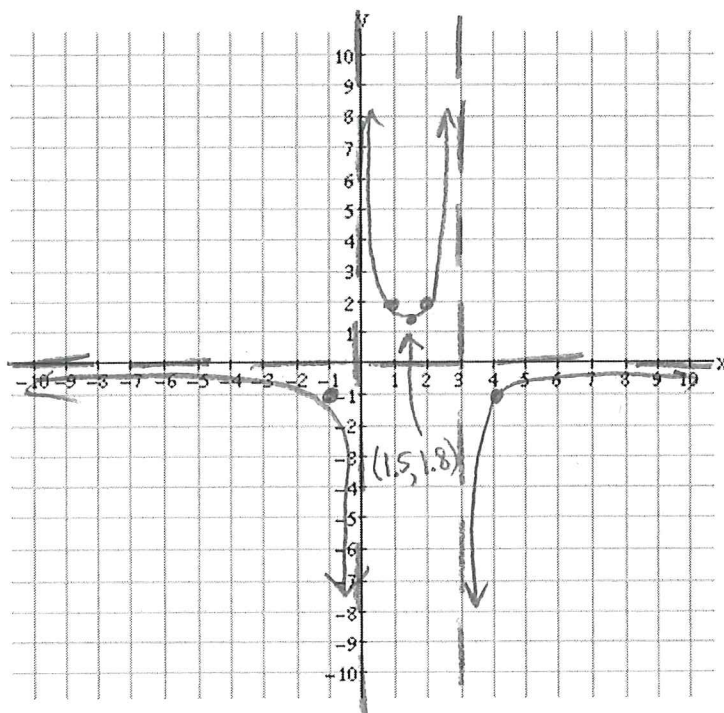
Range: $(-\infty, 0) \cup [1.8, \infty)$

x-intercept(s): none

y-intercept: none

End Behavior: As $x \rightarrow -\infty$, $f(x) \rightarrow$ 0

As $x \rightarrow \infty$, $f(x) \rightarrow$ 0



4.) $f(x) = \frac{3x^2 - 12x}{x^2 - 2x - 3}$ $f(x) = \frac{3x(x-4)}{(x-3)(x+1)}$

Vertical Asymptote: $x=3$ $x=-1$

Horizontal Asymptote: $y=3$

Hole(s): none

Domain: $(-\infty, -1) \cup (-1, 3) \cup (3, \infty)$

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

x-intercept(s): $(0,0)$ $(4,0)$

y-intercept: $(0,0)$

End Behavior: As $x \rightarrow -\infty$, $f(x) \rightarrow$ 3

As $x \rightarrow \infty$, $f(x) \rightarrow$ 3

