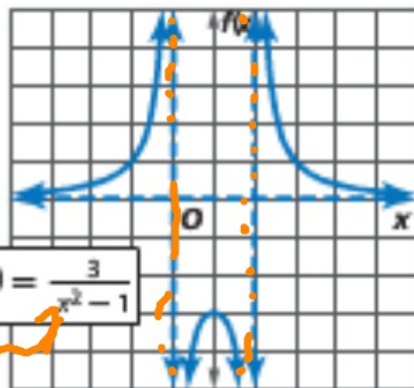


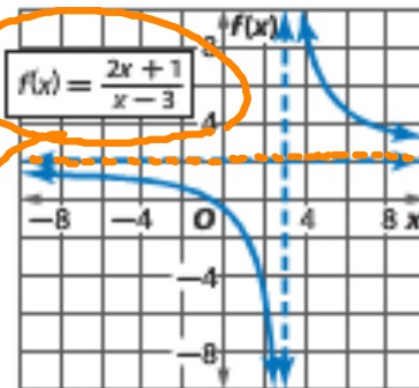
$$f(x) = \frac{x^2}{x+1}$$

Vertical asymptote:
 $x = -1$



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

Vertical asymptotes:
 $x = -1, x = 1$
Horizontal asymptote:
 $f(x) = 0$



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

Vertical asymptote:
 $x = 3$
Horizontal asymptote:
 $f(x) = 2$

$(x+1)(x-1)$

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

As $x \rightarrow \infty$:

$$f(x) \rightarrow \frac{x^2}{x} = x$$

$$f(x) = x$$

As $x \rightarrow \infty$
 $f(x) \rightarrow 2$

$$f(x) = \frac{1}{x}$$

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

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

As $x \rightarrow 0^+$
 $\frac{1}{0^+}$

$f(x) \rightarrow +\infty$

As $x \rightarrow 0^-$
 $\frac{1}{0^-}$

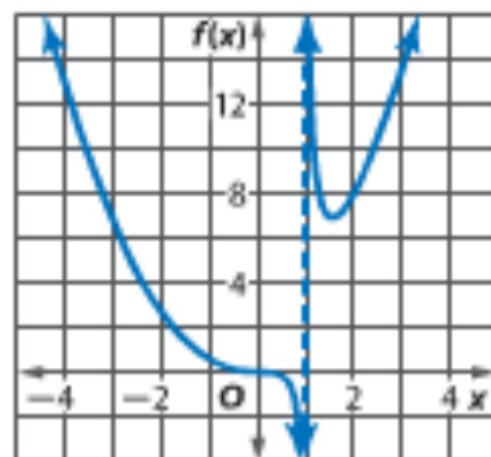
$f(x) \rightarrow -\infty$

Example 1 Graph with no Horizontal Asymptote



he points.

x	$f(x)$
-3	6.75
-2	2.67
-1	0.5
0	0
0.5	-0.25
1.5	6.75
2	8
3	13.5



Check Your Understanding

 = Step-b

Example 1 Graph each function. **1, 2.** See Chapter 8 Answer Appendix.

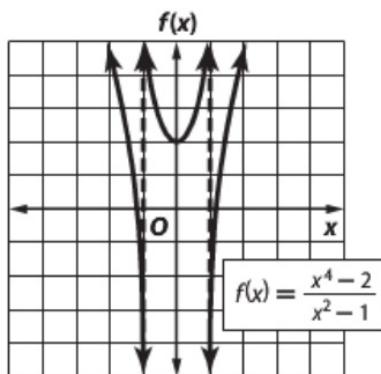
1. $f(x) = \frac{x^4 - 2}{x^2 - 1}$

$\Rightarrow \frac{x^4}{x^2} = x^2$

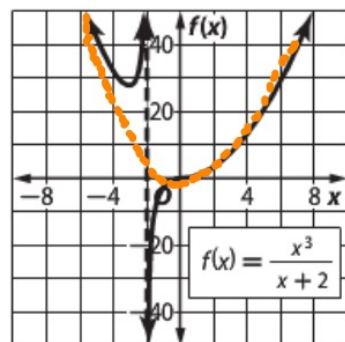
2. $f(x) = \frac{x^3}{x + 2}$

Lesson 8-4

1.



2.



As $x \rightarrow \infty$
 $f(x) \rightarrow \frac{x^3}{x} = x^2$