

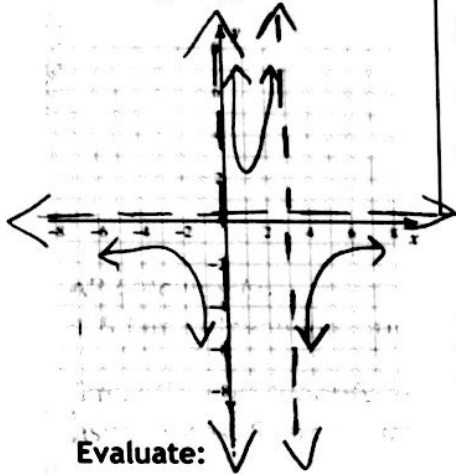
AP Calculus AB

1.5 Limits Involving Infinity/Asymptotes

Name: Key

Small Groups: Identify a) the points of discontinuity, b) holes, c) vertical asymptotes, and d) horizontal asymptotes. Sketch a graph. Answer the questions that follow.

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



- a) $x=0, x=3$
 b) none
 c) $x=0, x=3$
 d) $y=0$

$$-\frac{4}{x(x-3)}$$

Evaluate:

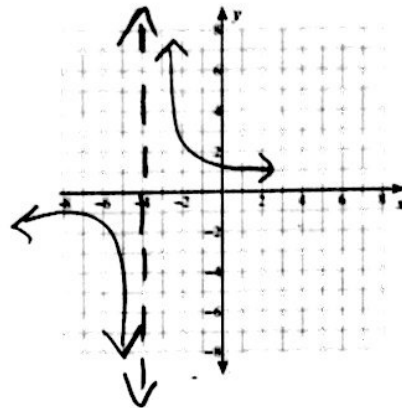
$$\lim_{x \rightarrow 0^+} f(x) = \infty$$

$$\lim_{x \rightarrow 0^-} f(x) = -\infty$$

$$\lim_{x \rightarrow 3^+} f(x) = -\infty$$

$$\lim_{x \rightarrow 3^-} f(x) = \infty$$

2)
 $f(x) = \frac{x-4}{-4x-16}$



- a) $x=-4$
 b) none
 c) $x=-4$
 d) $y = -\frac{1}{4}$

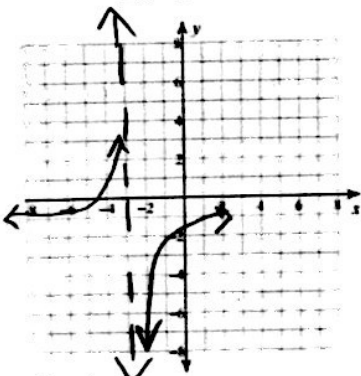
$$\frac{x-4}{-4(x+4)}$$

Evaluate:

$$\lim_{x \rightarrow -4^+} f(x) = \infty$$

$$\lim_{x \rightarrow -4^-} f(x) = -\infty$$

3)
 $f(x) = \frac{x+4}{-2x-6}$



- a) $x=-3$
 b) none
 c) $x=-3$
 d) $y = -\frac{1}{2}$

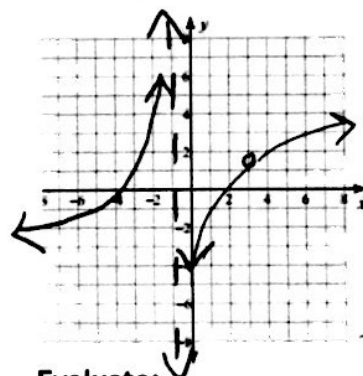
$$\frac{x+4}{-2(x+3)}$$

Evaluate:

$$\lim_{x \rightarrow -3^+} f(x) = -\infty$$

$$\lim_{x \rightarrow -3^-} f(x) = \infty$$

4)
 $f(x) = \frac{x^2 - 9x}{3x^2 - 6x - 9}$



- a) $x=3, -1$
 b) $x=3$
 c) $x=-1$
 d) none

$$\frac{x(x^2 - 9)}{3(x^2 - 2x + 3)}$$

Evaluate:

$$\lim_{x \rightarrow -1^+} f(x) = -\infty$$

$$\lim_{x \rightarrow -1^-} f(x) = \infty$$

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