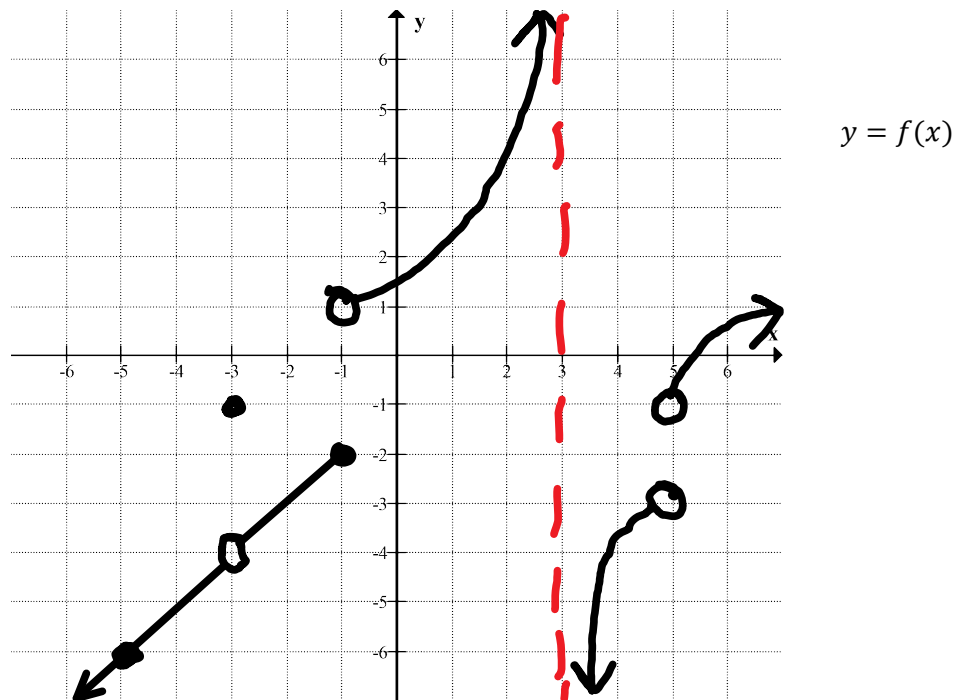# C12 - 1.1 - Limits Graph Hmk

Find the Limits.

$y = f(x)$

① $\lim_{x \to -5^-} f(x) =$ $\lim_{x \to -5^+} f(x) =$ $\lim_{x \to -5} f(x) =$ $f(-5) =$

Limit Exists/Limit DNE   Continuous/Discontinuous

② $\lim_{x \to -3^-} f(x) =$ $\lim_{x \to -3^+} f(x) =$ $\lim_{x \to -3} f(x) =$ $f(-3) =$

Limit Exists/Limit DNE   Continuous/Discontinuous

③ $\lim_{x \to -1^-} f(x) =$ $\lim_{x \to -1^+} f(x) =$ $\lim_{x \to -1} f(x) =$ $f(-1) =$

Limit Exists/Limit DNE   Continuous/Discontinuous

④ $\lim_{x \to 3^-} f(x) =$ $\lim_{x \to 3^+} f(x) =$ $\lim_{x \to 3} f(x) =$ $f(3) =$

⑤ $\lim_{x \to 5^-} f(x) =$ $\lim_{x \to 5^+} f(x) =$ $\lim_{x \to 5} f(x) =$ $f(5) =$

C12 - 1.1 - Limits Graph Hmk

Sketch the graph of $f(x)$ and find/circle the following. Confirm with algebra.

$f(x) = \begin{cases} x - 1 & ; \ x < 2 \\ 3 - x & ; \ x > 2 \end{cases}$

$\lim_{x \to 2^-} f(x) = \qquad \lim_{x \to 2} f(x) =$

$\lim_{x \to 2^+} f(x) = \qquad\qquad f(2) =$

Limit Exists/DNE   Continuous/
                    Discontinuous

$f(x) = \begin{cases} (x - 1)^2 & ; \ x < -1 \\ x + 1 & ; \ x > -1 \\ 1 & ; \ x = -1 \end{cases}$

$\lim_{x \to -1^-} f(x) = \qquad \lim_{x \to -1} f(x) =$

$\lim_{x \to -1^+} f(x) = \qquad\qquad f(-1) =$

Limit Exists/DNE   Continuous/
                    Discontinuous

$f(x) = \begin{cases} \sqrt{x} \\ -x & ; \ x < 0 \end{cases}$

$\lim_{x \to 0^-} f(x) = \qquad \lim_{x \to 0} f(x) =$

$\lim_{x \to 0^+} f(x) = \qquad\qquad f(0) =$

Limit Exists/DNE   Continuous/
                    Discontinuous

$f(x) = \begin{cases} \dfrac{1}{x} & ; \ x > 1 \\ 2 - x^2 & ; \ x \le 1 \end{cases}$

$\lim_{x \to 1^-} f(x) = \qquad \lim_{x \to 1} f(x) =$

$\lim_{x \to 1^+} f(x) = \qquad\qquad f(1) =$

Limit Exists/DNE   Continuous/
                    Discontinuous

$f(x) = \begin{cases} \dfrac{x^2 - 9}{x - 3} & ; \ x \ne 3 \\ 5 & ; \ x = 3 \end{cases}$

$\lim_{x \to 3^-} f(x) = \qquad \lim_{x \to 3} f(x) =$

$\lim_{x \to 3^+} f(x) = \qquad\qquad f(3) =$

Limit Exists/DNE   Continuous/
                    Discontinuous

Sketch the graph of that satisfies the following. Multiple answers.

$f(0) = 1$

$\lim_{x \to \infty} f(x) = \infty$

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

$f(3) = 1$
$f(1) = -1$
$\lim_{x \to 2^+} f(x) = \infty$
$\lim_{x \to 2^-} f(x) = -\infty$
$\lim_{x \to \pm\infty} f(x) = 0$

$f(-1) = 2$
$f(1) = 1$
$f(2) = DNE$
$\lim_{x \to 2} f(x) = 1$
$\lim_{x \to -\infty} f(x) = 0$

$\lim_{x \to 1^-} f(x) = 3$
$\lim_{x \to -2} f(x) = \pm\infty$
$\lim_{x \to \infty} f(x) = \infty$

$f(-1) = 2$
$f(1) = 1$
$f(2) = DNE$
$f'(3) = 1$ ↗
$; f''(-3) = -ve$ ↷
$; f''(-1) = +ve$ ↝

$\lim_{x \to 2} f(x) = 1$
$\lim_{x \to -\infty} f(x) = 0$
$\lim_{x \to 1^-} f(x) = 3$
$\lim_{x \to -2} f(x) = \pm\infty$
$\lim_{x \to \infty} f(x) = \infty$

C12 - 1.1 - Limit Find K Cont* Hmk

Find the value of k for $f(x)$ to be continuous.

$$f(x) = \begin{cases} \dfrac{x^2 - 9}{x - 3} & ; x \neq 3 \\ k & ; x = 3 \end{cases}$$

$$f(x) = \begin{cases} \dfrac{x^2 + x}{x + 1} & ; x \neq 0 \\ k & ; x = 0 \end{cases}$$

$$f(x) = \begin{cases} \dfrac{x^3 + 8}{x + 2} & ; x \neq -2 \\ k & ; x = -2 \end{cases}$$

$$f(x) = \begin{cases} x^2 + 1 & ; \quad x < 2 \\ k - x & ; \quad x \geq 2 \end{cases}$$

$$f(x) = \begin{cases} \dfrac{2x^2 + 3x + 1}{x^2 - 1} & ; x \neq -1 \\ k & ; x = -1 \end{cases}$$