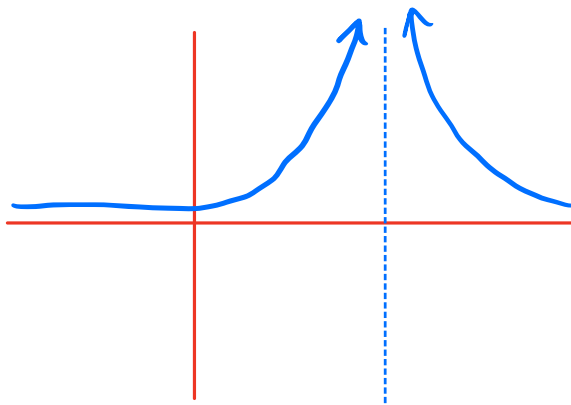


Name: Key Date \_\_\_\_\_

**Instructions:** For each question, neatly write a solution and circle your answer.

1. Determine if  $\lim_{x \rightarrow 4} \frac{1}{(x-4)^2}$  approaches a finite number,  $\infty$ ,  $-\infty$ , or does not exist.



$$\lim_{x \rightarrow 4} \frac{1}{(x-4)^2} = \infty$$

2. Let  $f(x) = \begin{cases} x^2 - x - 12, & x \leq 2 \\ -4x - 2, & 2 < x \leq 4 \\ -9, & x > 4 \end{cases}$

- (a) Determine if  $\lim_{x \rightarrow 2} f(x)$  approaches a finite number,  $\infty$ ,  $-\infty$ , or does not exist.

$$\lim_{x \rightarrow 2^-} f(x) = \lim_{x \rightarrow 2^-} x^2 - x - 12 = 2^2 - 2 - 12 = 4 - 2 - 12 = -10$$

$$\lim_{x \rightarrow 2^+} f(x) = \lim_{x \rightarrow 2^+} -4x - 2 = -4 \cdot 2 - 2 = -8 - 2 = -10$$

$$\lim_{x \rightarrow 2} f(x) = -10$$

- (b) Determine if  $\lim_{x \rightarrow 4} f(x)$  approaches a finite number,  $\infty$ ,  $-\infty$ , or does not exist.

$$\lim_{x \rightarrow 4^-} f(x) = \lim_{x \rightarrow 4^-} -4x - 2 = -4 \cdot 4 - 2 = -16 - 2 = -18$$

$$\lim_{x \rightarrow 4^+} f(x) = \lim_{x \rightarrow 4^+} -9 = -9$$

$$\lim_{x \rightarrow 4} f(x) \text{ DNE}$$