

First Quiz for Math 31

1. Calculate the following limits. If you think a certain limit doesn't exist state so and explain why.

(a) $\lim_{x \rightarrow 2} \frac{x^2 - x - 2}{x^2 + x - 6}$.

(b) $\lim_{x \rightarrow -4} \frac{|x + 4|}{x + 4}$.

(c) $\lim_{t \rightarrow 0} \frac{\sqrt{t^2 + 9} - 3}{t^2}$

(d) $\lim_{x \rightarrow \infty} \frac{5x^4 - 3x^2 + 2x - 1}{-3x^3 + 7x^2 - 8}$

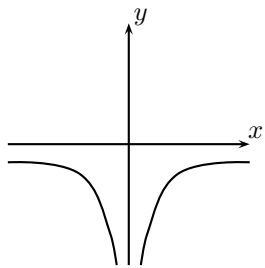
2. Let

$$f(x) = \begin{cases} ax^2 - 3x + 4 & \text{if } x \leq 2 \\ x + 3a & \text{if } x > 2 \end{cases}$$

Find the real number a so that $\lim_{x \rightarrow 2} f(x)$ exists.

3. By examining the graphs calculate the required limits. If you think that a certain limit doesn't exist state so.

a)

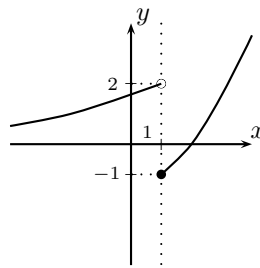


$$\lim_{x \rightarrow 0^+} f(x) =$$

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

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

b)

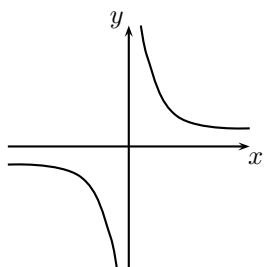


$$\lim_{x \rightarrow 1^+} f(x) =$$

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

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

c)

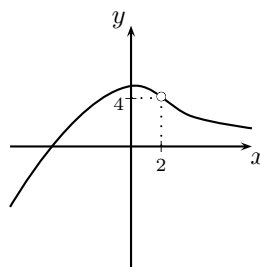


$$\lim_{x \rightarrow 0^+} f(x) =$$

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

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

c)



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

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

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