

Computing More Limits Algebraically

1. Compute the limits below if $f(x) = \begin{cases} x^2 - x + 3 & \text{if } x > 1 \\ 0 & \text{if } x = 1 \\ x + 1 & \text{if } x < 1 \end{cases}$

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

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

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

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

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

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

2. Compute the limits below.

(A) $\lim_{x \rightarrow 1^-} \frac{|x - 1|}{x^2 - 3x + 2}$

(B) $\lim_{x \rightarrow 1^+} \frac{|x^2 - 3x + 2|}{x^2 - 4x + 3}$

(C) $\lim_{x \rightarrow 0^-} \frac{|x - 1|}{x^2 - 3x + 2}$

(D) $\lim_{x \rightarrow 0^+} \frac{|x^2 - 3x + 2|}{x^2 - 4x + 3}$

3. Compute the limits below.

(A) $\lim_{x \rightarrow 0} \frac{\sin(3x)}{5x}$

(B) $\lim_{x \rightarrow 1} \frac{\sin(3x)}{5x}$

(C) $\lim_{x \rightarrow 0} \frac{2x}{\tan(5x)}$

(D) $\lim_{x \rightarrow 0} \frac{\tan(3x)}{5x}$

(E) $\lim_{x \rightarrow 0} \frac{1 - \cos(2x)}{3x}$

(C) $\lim_{x \rightarrow 0} \frac{1 - \cos(3x)}{\sin(5x)}$

4. Compute the limits below.

$$(A) \lim_{x \rightarrow 2^-} \frac{x-5}{x-2}$$

$$(B) \lim_{x \rightarrow 2^+} \frac{x-5}{x-2}$$

$$(C) \lim_{x \rightarrow 2} \frac{x-2}{x-5}$$

$$(D) \lim_{x \rightarrow 1^-} \frac{x-1}{x^2-2x+1}$$

$$(B) \lim_{x \rightarrow 1^+} \frac{x^2-3x+2}{x^2-2x+1}$$

5. Compute the limits below.

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

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

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

$$(D) \lim_{x \rightarrow -\infty} \frac{\sqrt{9x^4+2x^2+1}}{2x^2-x+1}$$