

PRETEST

LIMITS

1.18 Multiple Choice Questions on Limits

313. $\lim_{x \rightarrow \infty} \frac{3x^4 - 2x + 1}{7x - 8x^5 - 1} =$
- A) ∞ B) $-\infty$ C) 0 D) $\frac{3}{7}$ E) $-\frac{3}{8}$
314. $\lim_{x \rightarrow 0^-} \frac{1}{x} =$
- A) ∞ B) $-\infty$ C) 0 D) 1 E) does not exist
315. $\lim_{x \rightarrow 1/3} \frac{9x^2 - 1}{3x - 1} =$
- A) ∞ B) $-\infty$ C) 0 D) 2 E) 3
316. $\lim_{x \rightarrow 0} \frac{x^3 - 8}{x^2 - 4} =$
- A) 4 B) 0 C) 1 D) 3 E) 2
317. In order for the line $y = a$ to be a horizontal asymptote of $h(x)$, which of the following must be true?
- A) $\lim_{x \rightarrow a^+} h(x) = \infty$
- B) $\lim_{x \rightarrow a^-} h(x) = -\infty$
- C) $\lim_{x \rightarrow \infty} h(x) = \infty$
- D) $\lim_{x \rightarrow -\infty} h(x) = a$
- E) $\lim_{x \rightarrow -\infty} h(x) = \infty$
318. The function $G(x) = \begin{cases} x - 3 & x > 2 \\ -5 & x = 2 \\ 3x - 7 & x < 2 \end{cases}$ is not continuous at $x = 2$ because
- A) $G(2)$ is not defined
- B) $\lim_{x \rightarrow 2} G(x)$ does not exist
- C) $\lim_{x \rightarrow 2} G(x) \neq G(2)$
- D) $G(2) \neq -5$
- E) All of the above
319. $\lim_{x \rightarrow 0} \frac{3x^2 + 2x}{2x + 1} =$
- A) ∞ B) $-\infty$ C) 0 D) 1 E) $\frac{3}{2}$

320. $\lim_{x \rightarrow -1/2^-} \frac{2x^2 - 3x - 2}{2x + 1} =$
A) ∞ B) $-\infty$ C) 1 D) $\frac{3}{2}$ E) $-\frac{5}{2}$
321. $\lim_{x \rightarrow -2} \frac{\sqrt{2x+5} - 1}{x+2} =$
A) 1 B) 0 C) ∞ D) $-\infty$ E) does not exist
322. $\lim_{x \rightarrow -\infty} \frac{3x^2 + 2x^3 + 5}{x^4 + 7x^2 - 3} =$
A) 0 B) 2 C) $\frac{3}{7}$ D) ∞ E) $-\infty$
323. $\lim_{x \rightarrow 0} \frac{-x^2 + 4}{x^2 - 1} =$
A) 1 B) 0 C) -4 D) -1 E) ∞
324. The function $G(x) = \begin{cases} x^2 & x > 2 \\ 4 - 2x & x < 2 \end{cases}$ is not continuous at $x = 2$ because
A) $G(2)$ does not exist
B) $\lim_{x \rightarrow 2} G(x)$ does not exist
C) $\lim_{x \rightarrow 2} G(x) = G(2)$
D) All three statements A, B, and C
E) None of the above
325. The domain of the function $f(x) = \sqrt{4 - x^2}$ is
A) $x < -2$ or $x > 2$ B) $x \leq -2$ or $x \geq 2$ C) $-2 < x < 2$ D) $-2 \leq x \leq 2$ E) $x \leq 2$
326. $\lim_{x \rightarrow 5} \frac{x^2 - 25}{x - 5} =$
A) 0 B) 10 C) -10 D) 5 E) does not exist
327. Find k so that $f(x) = \begin{cases} \frac{x^2 - 16}{x - 4} & x \neq 4 \\ k & x = 4 \end{cases}$ is continuous for all x .
A) any value B) 0 C) 8 D) 16 E) no value

1.19 Sample A.P. Problems on Limits

328. For the function $f(x) = \frac{2x - 1}{|x|}$, find the following:

- a) $\lim_{x \rightarrow \infty} f(x)$;
- b) $\lim_{x \rightarrow -\infty} f(x)$;
- c) $\lim_{x \rightarrow 0^+} f(x)$;
- d) $\lim_{x \rightarrow 0^-} f(x)$;
- e) All horizontal asymptotes;
- f) All vertical asymptotes.

329. Consider the function $h(x) = \frac{1}{1 - 2^{1/x}}$.

- a) What is the domain of h ?
- b) Find all zeros of h .
- c) Find all vertical and horizontal asymptotes of h .
- d) Find $\lim_{x \rightarrow 0^+} h(x)$.
- e) Find $\lim_{x \rightarrow 0^-} h(x)$.
- f) Find $\lim_{x \rightarrow 0} h(x)$.

330. Consider the function $g(x) = \frac{\sin|x|}{x}$ defined for all real numbers.

- a) Is $g(x)$ an even function, an odd function, or neither? Justify your answer.
- b) Find the zeros and the domain of g .
- c) Find $\lim_{x \rightarrow 0} g(x)$.

331. Let $f(x) = \begin{cases} \sqrt{1-x^2} & 0 \leq x < 1 \\ 1 & 1 \leq x < 2. \\ 2 & x = 2 \end{cases}$

- a) Draw the graph of f .
- b) At what points c in the domain of f does $\lim_{x \rightarrow c} f(x)$ exist?
- c) At what points does only the left-hand limit exist?
- d) At what points does only the right-hand limit exist?