PRETEST

LIMITS

1.18 Multiple Choice Questions on Limits

313. $\lim_{x\to\infty} \dfrac{3x^4 - 2x + 1}{7x - 8x^5 - 1} =$

A) ∞ B) $-\infty$ C) 0 D) $\frac{3}{7}$ E) $-\frac{3}{8}$

314. $\lim_{x\to 0^-} \dfrac{1}{x} =$

A) ∞ B) $-\infty$ C) 0 D) 1 E) does not exist

315. $\lim_{x\to 1/3} \dfrac{9x^2 - 1}{3x - 1} =$

A) ∞ B) $-\infty$ C) 0 D) 2 E) 3

316. $\lim_{x\to 0} \dfrac{x^3 - 8}{x^2 - 4} =$

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) $\lim_{x\to a^+} h(x) = \infty$

B) $\lim_{x\to a^-} h(x) = -\infty$

C) $\lim_{x\to\infty} h(x) = \infty$

D) $\lim_{x\to-\infty} h(x) = a$

E) $\lim_{x\to-\infty} h(x) = \infty$

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) $\lim_{x\to 2} G(x)$ does not exist

C) $\lim_{x\to 2} G(x) \neq G(2)$

D) $G(2) \neq -5$

E) All of the above

319. $\lim_{x\to 0} \dfrac{3x^2 + 2x}{2x + 1} =$

A) ∞ B) $-\infty$ C) 0 D) 1 E) $\frac{3}{2}$

320. $\lim_{x\to -1/2^-} \dfrac{2x^2-3x-2}{2x+1} =$

A) ∞ B) $-\infty$ C) 1 D) $\frac{3}{2}$ E) $-\frac{5}{2}$

321. $\lim_{x\to -2} \dfrac{\sqrt{2x+5}-1}{x+2} =$

A) 1 B) 0 C) ∞ D) $-\infty$ E) does not exist

322. $\lim_{x\to -\infty} \dfrac{3x^2+2x^3+5}{x^4+7x^2-3} =$

A) 0 B) 2 C) $\frac{3}{7}$ D) ∞ E) $-\infty$

323. $\lim_{x\to 0} \dfrac{-x^2+4}{x^2-1} =$

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) $\lim_{x\to 2} G(x)$ does not exist

C) $\lim_{x\to 2} G(x) = G(2)$

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) $x \le -2$ or $x \ge 2$ C) $-2 < x < 2$ D) $-2 \le x \le 2$ E) $x \le 2$

326. $\lim_{x\to 5} \dfrac{x^2-25}{x-5} =$

A) 0 B) 10 C) -10 D) 5 E) does not exist

327. Find k so that $f(x) = \begin{cases} \dfrac{x^2-16}{x-4} & x \neq 4 \\ k & x = 4 \end{cases}$ 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 $f(x) = \dfrac{2x-1}{|x|}$, find the following:

a) $\lim_{x\to\infty} f(x)$; $= 2$

b) $\lim_{x\to-\infty} f(x)$; $= -2$

c) $\lim_{x\to0^+} f(x)$; $= -\infty$ $\frac{-2-1}{\frac{1}{10}} = \frac{-3}{\frac{1}{10}} = -30$ $\frac{-.02-1}{\frac{1}{100}} = \frac{-1.02}{\frac{1}{100}} = -102$

d) $\lim_{x\to0^-} f(x)$; $= \infty$

e) All horizontal asymptotes; $2, -2$ $y = 2, -2$

f) All vertical asymptotes. $x = 0$

329. Consider the function $h(x) = \dfrac{1}{1-2^{1/x}}$. $\frac{1}{1-2^{\frac{1}{\infty}}} = \frac{1}{1-2^{\infty}} = \frac{1}{-\infty} = 0$

a) What is the domain of h? $x \neq 0$

b) Find all zeros of h. NONE

c) Find all vertical and horizontal asymptotes of h. NONE

Plug in $\frac{1}{10}$ d) Find $\lim_{x\to0^+} h(x)$. $\frac{1}{1-2^{\frac{1}{10}}} = \frac{1}{1-2^{10}} = \frac{1}{-(\text{BIG NUMBER})} = \frac{1}{-\infty} = 0$

Plug in $-\frac{1}{10}$ e) Find $\lim_{x\to0^-} h(x)$. $\frac{1}{1-2^{\frac{1}{-10}}} = \frac{1}{1-2^{-10}} = \frac{1}{1-\frac{1}{2^{10}}} = \frac{1}{1-0} = 1$

f) Find $\lim_{x\to0} h(x)$. DNE

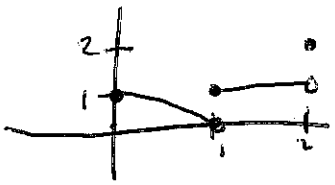
330. Consider the function $g(x) = \dfrac{\sin|x|}{x}$ defined for all real numbers.

SKIP ~~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 $\lim_{x\to0} g(x)$. $-\frac{\pi}{4}$ | 0 | $\frac{\pi}{4}$ ← they are opposites so $\lim_{x\to0}$ = DNE

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



a) Draw the graph of f. Plug in $x = 0, 1$

b) At what points c in the domain of f does $\lim_{x\to c} f(x)$ exist? $(0,1)$ $(1,2)$

c) At what points does only the left-hand limit exist? $x = 2$

d) At what points does only the right-hand limit exist? $x = 0$