

Test Form A

Name Answer Key

Date _____

Unit #2:

Class _____

Section _____

Review (11)

B

1. Find $\lim_{x \rightarrow 2} (3x^2 + 5)$. $3(2)^2 + 5 = 3 \cdot 4 + 5 = 12 + 5 = 17$

- (a) 41
- (b) 17
- (c) 11
- (d) 0
- (e) None of these

$\frac{2x < 4.01}{2} \implies x < 2.005$
 $2x - 1 - 3 < 0.01$
 $2x - 1 - 3 > -0.01$

D

2. Given $\lim_{x \rightarrow 2} (2x - 1) = 3$. Find δ such that $|(2x - 1) - 3| < 0.01$ whenever $0 < |x - 2| < \delta$.

- (a) 3
- (b) 0.05
- (c) 0.03
- (d) 0.005
- (e) None of these

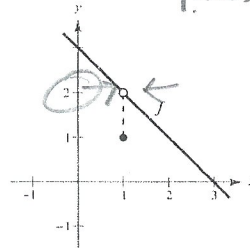
$2x > 3.99$
 $x > 1.995$

$1.995 < x < 2.005$
 $|1.995 - 2| = |-.005| = .005$
 $|2.005 - 2| = |.005| = .005$

A

3. Use the graph to find $\lim_{x \rightarrow 1} f(x)$ if $f(x) = \begin{cases} 3 - x, & x \neq 1 \\ 1, & x = 1 \end{cases}$.

- (a) 2
- (b) 1
- (c) $\frac{3}{2}$
- (d) The limit does not exist.
- (e) None of these



A

4. Find $\lim_{x \rightarrow -1} \frac{x^2 + 3x + 2}{x^2 + 1}$. $\frac{(-1)^2 + 3(-1) + 2}{(-1)^2 + 1} = \frac{1 - 3 + 2}{1 + 1} = \frac{0}{2} = 0$

- (a) 0
- (b) ∞
- (c) -1
- (d) The limit does not exist.
- (e) None of these

D

5. Find $\lim_{x \rightarrow 3} \sqrt{x^2 - 4}$. $\sqrt{3^2 - 4} = \sqrt{9 - 4} = \sqrt{5}$

- (a) 1
- (b) 5
- (c) -1
- (d) $\sqrt{5}$
- (e) None of these

C

6. If $\lim_{x \rightarrow c} f(x) = -\frac{1}{2}$ and $\lim_{x \rightarrow c} g(x) = \frac{2}{3}$, find $\lim_{x \rightarrow c} \frac{f(x)}{g(x)}$.

- (a) $-\frac{1}{3}$
- (b) $\frac{1}{3}$
- (c) $-\frac{3}{4}$
- (d) -3
- (e) None of these

$\frac{-\frac{1}{2}}{\frac{2}{3}} = -\frac{1}{2} \cdot \frac{3}{2} = -\frac{3}{4}$

B 7. Find the limit: $\lim_{x \rightarrow 2} \frac{x-2}{x^2-4} = \lim_{x \rightarrow 2} \frac{(x-2)}{(x-2)(x+2)} = \lim_{x \rightarrow 2} \frac{1}{x+2} = \frac{1}{2+2} = \frac{1}{4}$

- (a) 0 (b) $\frac{1}{4}$ (c) ∞
 (d) 1 (e) None of these

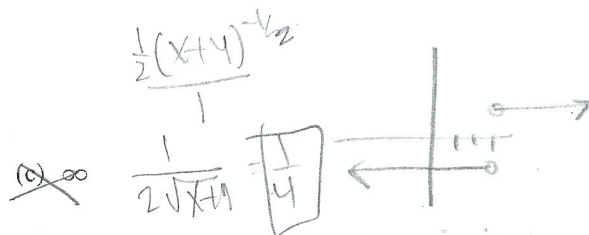
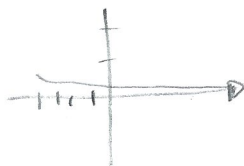
* B 8. Find the limit: $\lim_{x \rightarrow 0} \frac{\sqrt{x+4} - 2}{x}$

~~(a) 0~~

~~(d) 1~~

(b) $\frac{1}{4}$

(e) None of these



4R Limits and their ONE

D 9. Find the limit: $\lim_{x \rightarrow 3} \frac{x-3}{|x-3|}$

(a) 0

(d) The limit does not exist.

(b) 1

(e) None of these

$\lim_{x \rightarrow 3^-} \frac{x-3}{|x-3|} = \frac{-\#}{\#} = -1$

$\lim_{x \rightarrow 3^+} \frac{x-3}{|x-3|} = \frac{+\#}{+\#} = 1$

A 10. Find the limit: $\lim_{x \rightarrow 2} \sec \frac{\pi x}{3}$

(a) -2

(d) $\frac{1}{2}$

(b) $\frac{2}{\sqrt{3}}$

(e) None of these

$\sec \frac{2\pi}{3}$

$\sec = \frac{1}{\cos}$

$\frac{2\pi}{3} \left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

(c) $-\frac{\sqrt{3}}{2}$ $\frac{1}{\cos} = \frac{1}{-\frac{1}{2}} = -2$

* C 11. Find the limit: $\lim_{x \rightarrow 0} \frac{x}{\tan x}$

(a) 0

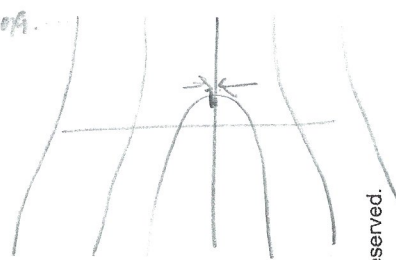
(d) The limit does not exist.

(b) $\frac{\pi}{4}$

(e) None of these

$\frac{\cos}{\sin(\cos)} = \frac{1}{\cos}$

(c) 1



A 12. Find the limit: $\lim_{x \rightarrow 3^+} \sqrt{2x-5}$

(a) 1

(d) The limit does not exist.

(b) 0

(e) None of these

$= \sqrt{2 \cdot 3 - 5} = \sqrt{6-5} = \sqrt{1} = 1$

(c) 2i

B 13. Find the limit: $\lim_{x \rightarrow 2^-} \frac{1}{x-2}$

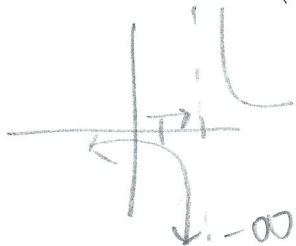
(a) ∞

(d) $-\frac{1}{4}$

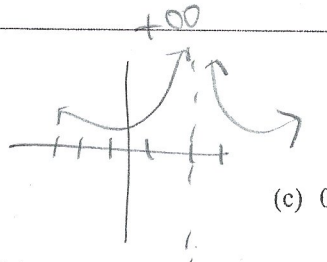
(b) $-\infty$

(e) None of these

(c) 0



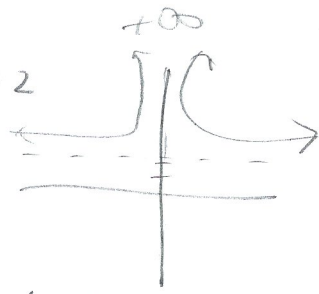
14. Find the limit: $\lim_{x \rightarrow 2} \frac{1}{(x-2)^2}$



- (a) ∞
- (b) $-\infty$
- (c) 0
- (d) $\frac{1}{4}$
- (e) None of these

15. Find the limit: $\lim_{x \rightarrow 0} \left(2x^2 + \frac{5}{x^2} \right)$

$\frac{2x^2+5}{x^2}$ vertical $x=0$ horizontal $y=2$



- (a) 7
- (b) 2
- (c) ∞
- (d) 0
- (e) None of these

16. At which values of x is $f(x) = \frac{x^2 - 2x - 3}{x - 2}$ discontinuous? $\frac{(x-3)(x+1)}{x-2}$

vertical at $x=2$

- (a) 2
- (b) $-1, 2, 3$
- (c) 1
- (d) $-1, \frac{3}{2}, 2, 3$
- (e) None of these

17. Let $f(x) = \frac{1}{x+1}$ and $g(x) = x^2 - 5$. Find all values of x for which $f(g(x))$ is discontinuous.

$$\frac{1}{(x^2-5)+1} = \frac{1}{x^2-4}$$

- (a) -1
- (b) $-1, \pm\sqrt{5}$
- (c) $\pm\sqrt{5}$
- (d) -2, 2
- (e) None of these

18. Determine the value of c so that $f(x)$ is continuous on the entire real line when $f(x) = \begin{cases} x-2, & x \leq 5 \\ cx-3, & x > 5 \end{cases}$

$$\frac{1}{(x+2)(x-2)}$$

- (a) 0
- (b) $\frac{6}{5}$
- (c) 1
- (d) $\frac{5}{6}$
- (e) None of these

$$f(5) = 5 - 2 = 3$$

$$(5, 3)$$

19. Find all vertical asymptote(s) of $f(x) = \frac{x-3}{x+2}$

$$x = -2$$

- (a) $x = -2, x = 3$
- (b) $x = -2$
- (c) $x = 3$
- (d) $x = 1$
- (e) None of these

$$c \cdot 5 - 3 = 3$$

$$\frac{5c}{5} = \frac{6}{5} \quad c = \frac{6}{5}$$

20. Find all vertical asymptote(s) of $g(x) = \frac{2x+3}{2x^2+x-3}$

Hand-drawn graph of a rational function with vertical asymptotes at $x = -2$ and $x = 1$. The graph shows two branches separated by these asymptotes. The x-axis has tick marks at -2 and 1. The y-axis has tick marks at 3 and -2. The function approaches positive infinity as x approaches -2 from the right and x approaches 1 from the left. The function approaches negative infinity as x approaches -2 from the left and x approaches 1 from the right. The graph is labeled with 'vertical asymp' and 'hole'.

Handwritten notes: $\frac{(2x+3)}{(2x+3)(x-1)}$ vertical asymp $x=1$

- (a) $x = -\frac{3}{2}, x = 1$
- (b) $x = -\frac{3}{2}$
- (c) $x = 1$
- (d) $y = 1$
- (e) None of these

