

Exam

Name _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

1) Find: $\lim_{x \rightarrow 2} \frac{x^2 - 5x + 2}{3x - 4}$ 1) _____

2) Find: $\lim_{x \rightarrow 8} 15$ 2) _____

3) Find: $\lim_{p \rightarrow 4} \frac{p^2 - 7p + 12}{p^2 - 3p - 4}$ 3) _____

4) Find: $\lim_{x \rightarrow -2} \frac{x^2 + 4x + 4}{x^2 - 4}$ 4) _____

5) Find: $\lim_{h \rightarrow 0} \frac{5 + h}{x}$ 5) _____

6) If $f(x) = 3x - 4$, find $\lim_{h \rightarrow 0} \frac{f(x + h) - f(x)}{h}$ by treating x as a constant. 6) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

7) $\lim_{t \rightarrow 2} \frac{t^2 - t - 2}{t^2 + 3t - 10} =$ 7) _____
A) $\frac{1}{5}$ B) ∞ C) -1 D) $\frac{3}{7}$ E) $-\infty$

8) $\lim_{x \rightarrow -3} \frac{x^2 + 2x - 3}{x^2 + 7x + 12} =$ 8) _____
A) 4 B) 0 C) 2 D) -4 E) $-\infty$

9) $\lim_{h \rightarrow 0} \frac{x^2 + h}{x + 2h} =$ 9) _____
A) ∞
B) x
C) 0
D) $-\infty$
E) does not exist

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

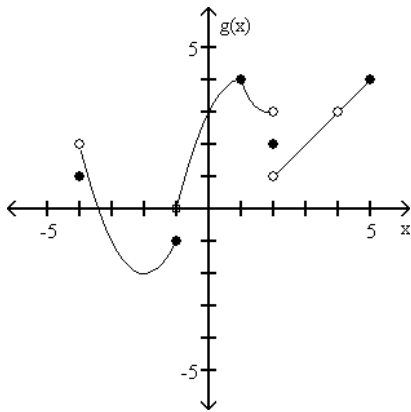
10) Find $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ where $f(x) = \frac{1}{2x+3}$ 10) _____

11) Find $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ where $f(x) = 2x^2 + 3x + 5$ 11) _____

12) Find: Find $\lim_{x \rightarrow 1} \frac{x^2 - 2x + 1}{x^2 - 1}$ 12) _____

13) Find: Find $\lim_{x \rightarrow 2} \frac{x^3 - 8}{x - 2}$ 13) _____

14) Find: $\lim_{x \rightarrow -1^-} g(x)$ 14) _____



15) Find: $\lim_{x \rightarrow \infty} \frac{2x^2 - 4x + 9}{3x^2 - 8}$. If the limit does not exist, so state or use the symbol ∞ or $-\infty$ if appropriate. 15) _____

16) Find: $\lim_{x \rightarrow \infty} \frac{2x^2 - 4}{6x^3 + 2x^2}$. If the limit does not exist, so state or use the symbol ∞ or $-\infty$ if appropriate. 16) _____

17) Find: $\lim_{x \rightarrow \infty} \frac{4x^2 - 6x}{x^2 + 4x}$. If the limit does not exist, so state or use the symbol ∞ or $-\infty$ if appropriate. 17) _____

18) If $f(x) = \begin{cases} 3 - x, & \text{if } x > 2 \\ 3x - 5, & \text{if } x < 2 \end{cases}$, find $\lim_{x \rightarrow 2} f(x)$. Hint: Sketch the graph of f . 18) _____

19) If $f(x) = \begin{cases} 4, & \text{if } x > 3 \\ x + 1, & \text{if } x < 3 \end{cases}$, find $\lim_{x \rightarrow 3} f(x)$. Hint: Sketch the graph of f . 19) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

20) $\lim_{x \rightarrow \infty} \frac{3x^2 - 4x + 2}{2x^2 + x + 1} =$ 20) _____

A) $\frac{3}{2}$ B) 2 C) ∞ D) $-\infty$ E) -4

21) If $f(x) = \begin{cases} x + 1, & \text{if } x \geq 1 \\ x - 1, & \text{if } x < 1 \end{cases}$, then $\lim_{x \rightarrow 1} f(x) =$ 21) _____

A) 0
 B) $-\infty$
 C) 2
 D) ∞
 E) does not exist

22) If $f(x) = \begin{cases} x + 2, & \text{if } x > 0 \\ x^2 + 3, & \text{if } x < 0 \end{cases}$, then $\lim_{x \rightarrow 0^-} f(x) =$ 22) _____

A) 0
 B) 2
 C) ∞
 D) 3
 E) does not exist

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

23) 23) _____

$$f(x) = \begin{cases} 2 - x^2 & \text{if } x > 1 \\ -2 + 3x & \text{if } 0 \leq x \leq 1 \\ 4 - x^2 & \text{if } x < 0 \end{cases}$$

Find

- (a) $\lim_{x \rightarrow 1^+} f(x)$
- (b) $\lim_{x \rightarrow 1^-} f(x)$
- (c) $\lim_{x \rightarrow 0^-} f(x)$

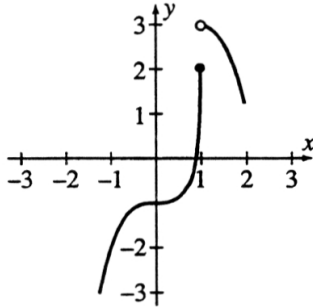
24) By looking at the graph, give the following limits.

24) _____

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

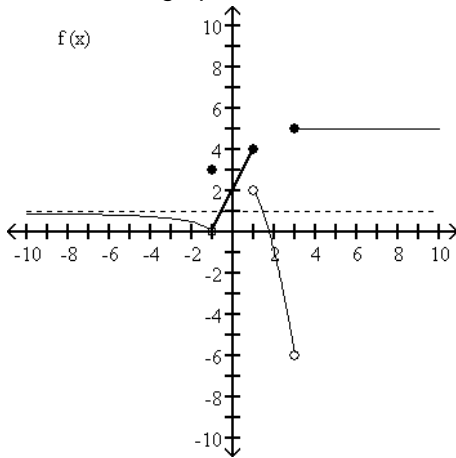
(b) $\lim_{x \rightarrow 1^-} f(x)$

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



25) Consider the graph of $f(x)$

25) _____



Determine the following limits:

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

(d) $f(-2)$

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

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

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

(h) $f(1)$

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

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

26) Find the value(s) of x for which $f(x) = \frac{2x}{x^2 - 3x + 2}$ is discontinuous.

26) _____

27) Find the value(s) of x for which $f(x) = \frac{x + 2}{x^3 - 4x}$ is discontinuous.

27) _____

28) Find the value(s) of x for which $f(x) = \begin{cases} 2x + 1, & \text{if } x \geq 1 \\ 3, & \text{if } x < 1 \end{cases}$ is discontinuous.

28) _____

29) Find the value(s) of x for which $f(x) = \begin{cases} x^2, & \text{if } x \geq 2 \\ 3x, & \text{if } x < 2 \end{cases}$ is discontinuous. 29) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

30) Let $f(x) = \frac{x(x+1)}{x^2-1}$. The only value(s) of x for which f is discontinuous is (are) 30) _____

- A) -1, 0, and 1.
- B) -1 and 1.
- C) -1.
- D) 1.
- E) 0.

31) Let $f(x) = \frac{x^2-9}{x^2+2x+1}$. The only value(s) of x for which f is discontinuous is (are) 31) _____

- A) 1, -3 and 3.
- B) -1.
- C) -1 and 1.
- D) -3 and 3.
- E) -1, 1, -3, and 3.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

32) 32) _____

$$\text{Let } f(x) = \begin{cases} \frac{1}{3+x} & \text{if } x \geq 0 \\ \frac{2}{5+x} & \text{if } x < 0 \end{cases}$$

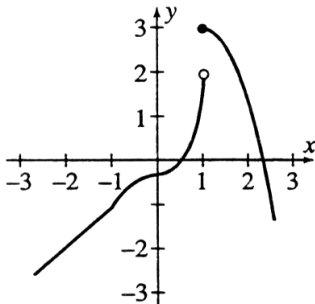
Find all points where this function $f(x)$ is not continuous.

33) 33) _____

$$\text{Let } f(x) = \begin{cases} 2 - x^2 & \text{if } x > 1 \\ -2 + 3x & \text{if } 0 \leq x \leq 1 \\ 1 - x^2 & \text{if } x < 0 \end{cases}$$

Find all points of discontinuity for this function.

34) By looking at the graph below, state whether the function $f(x)$ is continuous or discontinuous at $x = -1$. 34) _____



Answer Key

Testname: UNTITLED2

- 1) -2
- 2) 15
- 3) $\frac{1}{5}$
- 4) 0
- 5) $\frac{5}{x}$
- 6) 3
- 7) D
- 8) D
- 9) B
- 10) $-\frac{2}{(2x+3)^2}$
- 11) $4x+3$
- 12) 0
- 13) 12
- 14) -1
- 15) $\frac{2}{3}$
- 16) 0
- 17) 4
- 18) 1
- 19) 4
- 20) A
- 21) E
- 22) D
- 23) (a) 1 (b) 1 (c) 4
- 24) (a) 3 (b) 2 (c) -2
- 25) (a) 0
- (b) 0
- (c) 0
- (d) 3
- (e) 2
- (f) 4
- (g) Does not exist
- (h) 4
- 26) 1, 2
- 27) $0, \pm 2$
- 28) none
- 29) 2
- 30) B
- 31) B
- 32) $x = 0; -5$
- 33) Continuous everywhere, except $x = 0$.
- 34) continuous