Name_____ Date_____ Period_____

Practice TEST: AB/BC Limits and continuity

Part I: MULTIPLE CHOICE (USE CAPITAL LETTERS)

Determine the limit by substitution.

1) $\lim_{x \to 0} \frac{x^3 - 6x + 8}{x - 2}$ 1) _____

A) Does not exist B) -4 C) 4 D) 0

Determine the limit algebraically, if it exists.

2) $\lim_{x \to 10} \frac{|10 - x|}{10 - x}$ 2) _____

A) -1 B) Does not exist C) 1 D) 0

3) $\lim_{x \to 4} \frac{x^2 + 4x - 32}{x^2 - 16}$ 3) _____

A) $-\frac{1}{2}$ B) Does not exist C) $\frac{3}{2}$ D) 0

4) $\lim_{x \to 0} \frac{\frac{1}{x+3} - \frac{1}{3}}{x}$ 4) _____

A) $\frac{1}{9}$ B) 0 C) Does not exist D) $-\frac{1}{9}$

5) $\lim_{x \to 0} \frac{6 \sin x}{7x}$ 5) _____

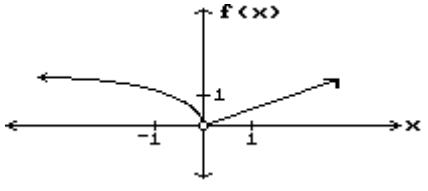
A) Does not exist B) $\frac{6}{7}$ C) 1 D) 0

6) $\lim_{x \to 2} \sqrt{x - 3}$ 6) _____

A) 1 B) -1 C) Does not exist D) 0

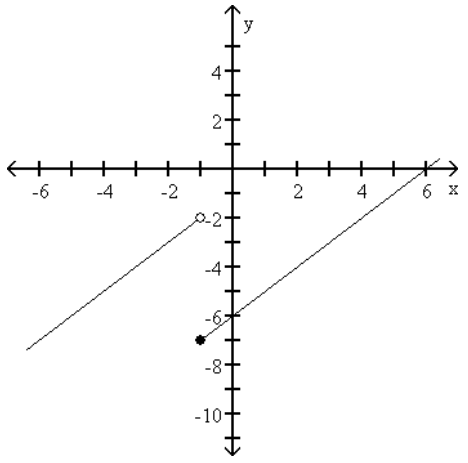
Determine the limit graphically, if it exists.

7) $\lim_{x \to 0} f(x)$ 7) _____



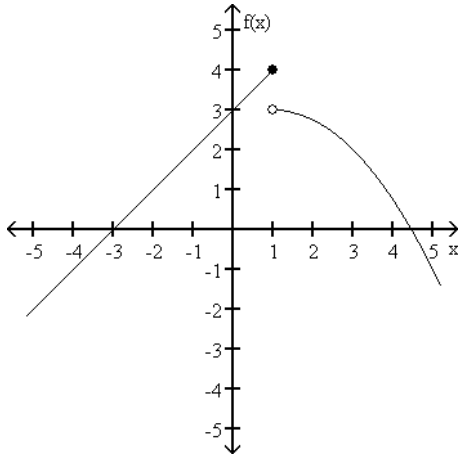
A) Does not exist B) 1 C) 0 D) -1

8) Find $\lim_{x \to -1^-} f(x)$ and $\lim_{x \to -1^+} f(x)$. 8) _____



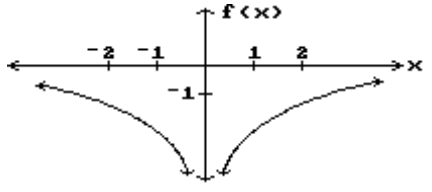
A) -2; -7 B) -7; -2 C) -7; -5 D) -5; -2

9) $\lim_{x \to 1^+} f(x)$ 9) _____



A) 4 B) Does not exist C) 3 D) $3\frac{1}{2}$

10) $\lim_{x \to 0} f(x)$ 10) _____



A) 2 B) 0 C) Does not exist D) -2

Find the indicated limit.

11) $\lim_{x \to 0^+} \frac{7x}{|x|}$ 11) _____

A) Does not exist B) 0 C) -7 D) 7

Find the limit.

12) Let $\lim_{x \to -1} f(x) = 49$. Find $\lim_{x \to -1} \sqrt{f(x)}$. 12) _____

A) 49 B) 7 C) -1 D) 2.6458

13) Let $\lim_{x \to 6} f(x) = -7$ and $\lim_{x \to 6} g(x) = -8$. Find $\lim_{x \to 6} \frac{-7f(x) - 6g(x)}{-3 + g(x)}$. 13) _____

A) $-\frac{1}{11}$ B) 6 C) $-\frac{97}{11}$ D) $-\frac{67}{3}$

Evaluate or determine that the limit does not exist for each of the limits (a) $\lim_{x \to d-} f(x)$, (b) $\lim_{x \to d+} f(x)$, and (c) $\lim_{x \to d} f(x)$ for the given function f and number d.

14) 14) _____

$$f(x) = \begin{cases} -2x - 2, & \text{for } x < 1, \\ 1, & \text{for } x = 1, \\ -4x + 8, & \text{for } x > 1 \end{cases}$$

d = 1

A) (a) -4
(b) 4
(c) 0

B) (a) 4
(b) -4
(c) 0

C) (a) -4
(b) 4
(c) Does not exist

D) (a) 4
(b) -4
(c) Does not exist

15) 15) _____

$$f(x) = \begin{cases} 3x - 1, & \text{for } x \le 1, \\ -3x + 5, & \text{for } x > 1 \end{cases}$$

d = 1

A) (a) 2
(b) 2
(c) Does not exist

B) (a) 2
(b) 2
(c) 2

C) (a) 5
(b) -1
(c) Does not exist

D) (a) -1
(b) 5
(c) Does not exist

16) 16) _____

$$f(x) = \begin{cases} \frac{1}{x + 1}, & \text{for } x > -1, \\ x^2 - 3x, & \text{for } x \le -1 \end{cases}$$

d = -1

A) (a) Does not exist
(b) 4
(c) Does not exist

B) (a) 4
(b) Does not exist
(c) 4

C) (a) Does not exist
(b) 4
(c) 4

D) (a) 4
(b) Does not exist
(c) Does not exist

Provide an appropriate response.

17) It can be shown that the inequalities 17) _____

$-x \le x\cos(\frac{1}{x}) \le x$

hold for all values of $x \ge 0$. Find $\lim_{x\to 0} x\cos(\frac{1}{x})$ if it exists

A) 0.0007 B) 0 C) Does not exist D) 1

Find the limit, if it exists.

18) $\lim_{x\to\infty} \frac{x^2 - 4x + 17}{x^3 + 9x^2 + 8}$ 18) _____

A) 0 B) 1 C) $\frac{17}{8}$ D) ∞

19) $\lim_{x\to -\infty} \frac{4x^3 + 3x^2}{x - 6x^2}$ 19) _____

A) $-\infty$ B) 4 C) ∞ D) $-\frac{1}{2}$

20) $\lim_{x\to\infty} \frac{4x^{-1} + -2x^{-3}}{2x^{-2} + x^{-5}}$ 20) _____

A) 0 B) 2 C) $-\infty$ D) ∞

Find the indicated limit.

21) $\lim_{x\to -\infty} \frac{\sin x}{x}$ 21) _____

A) ∞ B) 0 C) 1 D) Does not exist

Find the limit.

22) $\lim_{x\to(-2)^+} \frac{1}{x + 2}$ 22) _____

A) 1/2 B) -1/2 C) ∞ D) $-\infty$

23) $\lim_{x\to(\pi/2)^+} \tan x$ 23) _____

A) 0 B) 1 C) $-\infty$ D) ∞

Find all points where the function is discontinuous.

24) 24) _____

$$f(x) = \begin{cases} \frac{x(x^2 - 4)}{x + 2}, & x \ne -2 \\ -4, & x = -2 \end{cases}$$

A) Continuous for all x B) x = 2
C) x = -4 D) x = -2

Find a value for a so that the function f(x) is continuous.

25) $f(x) = \begin{cases} x^2 - 5, & x < 4 \\ 5ax, & x \geq 4 \end{cases}$ 25) _____

A) a = 9 B) $a = \frac{4}{5}$ C) a = 11 D) $a = \frac{11}{20}$