Miami Dade College

Review 1 Calculus 1.   Summer 2019   Limits & Continuity
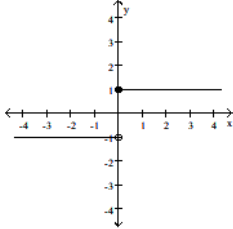
Note: Exam consists of 10 multiple choice questions and 12 free response questions.
      Two of the free response questions for extra-credit.

Use the graph to evaluate the limit.

1) $\lim\limits_{x \to 0} f(x)$ 1) _____

    A) 1   B) -1   C) does not exist   D) ∞

Find the limit.

2) $\lim\limits_{x \to 0} (\sqrt{x} - 2)$ 2) _____

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

3) $\lim\limits_{x \to -1} \dfrac{x}{3x + 2}$ 3) _____

        A) 0   B) $-\dfrac{1}{5}$ C) 1   D) does not exist

Find the limit, if it exists.

4) $\lim\limits_{x \to 15} \dfrac{1}{x - 15}$ 4) _____

        A) 0   B) Does not exist   C) 15   D) 30

5) $\lim\limits_{x \to 0} \dfrac{\sqrt{1 + x} - 1}{x}$ 5) _____

        A) 1/2   B) Does not exist   C) 1/4   D) 0

6) $\lim\limits_{x \to 5} \dfrac{x^2 - 2x - 15}{x + 3}$ 6) _____

        A) -8   B) 5   C) Does not exist   D) 0

1

7) $\lim\limits_{x \to 4} \dfrac{x^2 - 16}{x - 4}$

    A) Does not exist   B) 8   C) 4   D) 1

7) _____

8) $\lim\limits_{x \to 3} \dfrac{x^2 - 9}{x^2 - 5x + 6}$

    A) 3   B) Does not exist   C) 0   D) 6

8) _____

Find the limit.

9) $\lim\limits_{x \to 0} \sqrt{3 + \cos^2 x}$

    A) 2   B) $\sqrt{3}$ C) 3   D) 4

9) _____

Give an appropriate answer.

10) Let $\lim\limits_{x \to 2} f(x) = 7$ and $\lim\limits_{x \to 2} g(x) = 1$. Find $\lim\limits_{x \to 2} \dfrac{f(x)}{g(x)}$.

    A) $\dfrac{1}{7}$ B) 2   C) 6   D) 7

10) _____

11) Let $\lim\limits_{x \to 6} f(x) = -4$ and $\lim\limits_{x \to 6} g(x) = -9$. Find $\lim\limits_{x \to 6} [f(x) + g(x)]^2$.

    A) 97   B) 5   C) 169   D) -13

11) _____

Provide an appropriate response.

12) If $x^3 \le f(x) \le x$ for x in $[-1,1]$, find $\lim\limits_{x \to 0} f(x)$ if it exists.

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

12) _____

13) If $\lim\limits_{x \to 2} \dfrac{f(x) - 1}{x - 1} = 2$, find $\lim\limits_{x \to 2} f(x)$.

    A) 4   B) 2   C) 3   D) Does not exist

13) _____

14) If $\lim\limits_{x \to 2} \dfrac{f(x)}{x} = 3$, find $\lim\limits_{x \to 2} f(x)$.

    A) 6   B) 2   C) 3   D) Does not exist

14) _____

A function f(x), a point x_0, the limit of f(x) as x approaches x_0, and a positive number ε is given. Find a number $\delta > 0$ such that for all x, $0 < |x - x_0| < \delta \Rightarrow |f(x) - L| < \varepsilon$.

15) $f(x) = 9x + 1$, $L = 19$, $x_0 = 2$, and $\varepsilon = 0.01$

    A) 0.001111   B) 0.005556   C) 0.002222   D) 0.005

15) _____

16) $f(x) = 6x - 9$, $L = 3$, $x_0 = 2$, and $\varepsilon = 0.01$

    A) 0.003333   B) 0.001667   C) 0.005   D) 0.000833

16) _____

Find the limit L for the given function f, the point x_0, and the positive number ε. Then find a number $\delta > 0$ such that, for all x, $0 < |x - x_0| < \delta \Rightarrow |f(x) - L| < \varepsilon$.

17) $f(x) = 5x + 7$, $x_0 = 2$, $\varepsilon = 0.05$

    A) $L = -3$; $\delta = 0.02$ B) $L = 3$; $\delta = 0.01$ C) $L = 17$; $\delta = 0.01$ D) $L = 17$; $\delta = 0.02$

17) _____
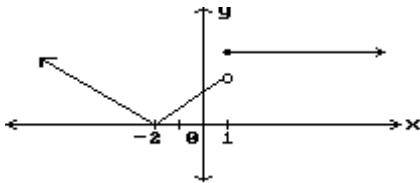
Find the limit using $\lim\limits_{x=0} \dfrac{\sin x}{x} = 1$.

18) $\lim\limits_{x \to 0} \dfrac{\sin 5x}{x}$

    A) 1   B) does not exist   C) $\dfrac{1}{5}$ D) 5

18) _____

19) $\lim\limits_{x \to 0} \dfrac{x^2 - 2x + \sin x}{x}$

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

19) _____

20) $\lim\limits_{x \to 0} \dfrac{\sin 5x}{\sin 4x}$

    A) $\dfrac{5}{4}$ B) $\dfrac{4}{5}$ C) does not exist   D) 0

20) _____

Find all points where the function is discontinuous.

21)

    A) x = -2, x = 1   B) None   C) x = 1   D) x = -2

21) _____

Solve the problem.

22) To what new value should f(2) be changed to remove the discontinuity?

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

    A) 5   B) 6   C) -1   D) -2

22) _____

Find the intervals on which the function is continuous.

23) $y = \dfrac{1}{(x + 4)^2 + 8}$

    A) continuous everywhere   B) discontinuous only when x = 24
    C) discontinuous only when x = -32   D) discontinuous only when x = -4

23) _____

24) $y = \dfrac{x + 1}{x^2 - 10x + 24}$

24) _____

    A) discontinuous only when x = -4 or x = 6   B) discontinuous only when x = 4 or x = 6

    C) discontinuous only when x = -6 or x = 4   D) discontinuous only when x = 4

Find numbers a and b, or k, so that f is continuous at every point.

25)

25) _____

$$f(x) = \begin{cases} -2, & x < 1 \\ ax + b, & 1 \le x \le 2 \\ 5, & x > 2 \end{cases}$$

    A) a = -2, b = 5   B) a = 7, b = -9   C) a = 7, b = 19   D) Impossible

Find the limit.

26) $\displaystyle\lim_{x \to \infty} \dfrac{7}{x} - 1$

26) _____

    A) -8   B) 1   C) 6   D) -1

27) $\displaystyle\lim_{x \to \infty} \dfrac{x^2 + 3x + 7}{x^3 - 2x^2 + 13}$

27) _____

    A) $\dfrac{7}{13}$ B) 0   C) 1   D) ∞

28) $\displaystyle\lim_{x \to -\infty} \dfrac{-14x^2 - 3x + 17}{-6x^2 + 8x + 13}$

28) _____

    A) $\dfrac{7}{3}$ B) 1   C) $\dfrac{17}{13}$ D) ∞

29) $\displaystyle\lim_{x \to -\infty} \dfrac{2x^3 + 3x^2}{x - 5x^2}$

29) _____

    A) $-\infty$ B) $-\dfrac{3}{5}$ C) ∞ D) 2

30) $\displaystyle\lim_{x \to 5^+} \dfrac{1}{x - 5}$

30) _____

    A) $-\infty$ B) ∞ C) -1   D) 0

1) C
2) B
3) C
4) B
5) A
6) D
7) B
8) D
9) A
10) D
11) C
12) B
13) C
14) A
15) A
16) B
17) C
18) D
19) D
20) A
21) C
22) B
23) A
24) B
25) B
26) D
27) B
28) A
29) C
30) B