

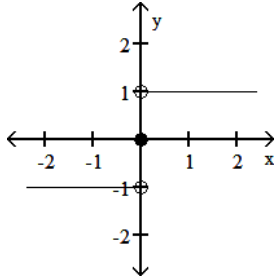
Find the average rate of change of the function over the given interval.

1) $h(t) = \sin(5t), \left[0, \frac{\pi}{10}\right]$

1) _____

Use the graph to evaluate the limit.

- 2) a. Find $\lim_{x \rightarrow 0^+} f(x)$; b. Find $\lim_{x \rightarrow 0^-} f(x)$; c. Find $\lim_{x \rightarrow 0} f(x)$; d. Find $f(0)$



a) _____ b) _____ c) _____ d) _____

Find the limit if it exists.

3) $\lim_{x \rightarrow -6} 9x(x + 2)(x - 7)$

3) _____

Find the limit, if it exists.

4) $\lim_{x \rightarrow -9} \frac{x^2 + 11x + 18}{x + 9}$

4) _____

5) $\lim_{x \rightarrow 3} \frac{x^2 + 2x - 15}{x^2 - 9}$

5) _____

Find the limit.

6) $\lim_{x \rightarrow 0} (6 \sin x - 1)$

6) _____

Provide an appropriate response.

7) Let $\lim_{x \rightarrow 10} f(x) = 7$ and $\lim_{x \rightarrow 10} g(x) = -6$. Find $\lim_{x \rightarrow 10} [f(x) - g(x)]$.

7) _____

Given the interval (a, b) on the x -axis with the point c inside, find the greatest value for $\delta > 0$ such that for all x , $0 < |x - c| < \delta \Rightarrow a < x < b$.

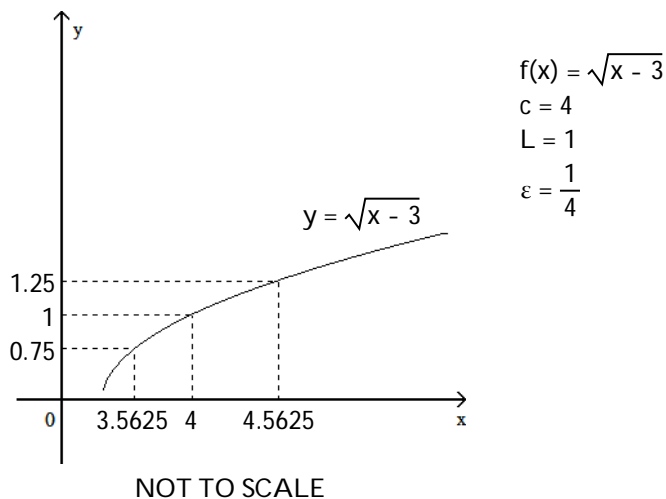
8) $a = 1.333, b = 2.736, c = 1.838$

8) _____

Use the graph to find a $\delta > 0$ such that for all x , $0 < |x - c| < \delta \Rightarrow |f(x) - L| < \epsilon$.

9)

9) _____



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

10) $f(x) = 4x - 3$, $L = 1$, $c = 1$, and $\epsilon = 0.01$

10) _____

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

11) $f(x) = 5x - 7$, $c = 5$, $\epsilon = 0.15$

11) _____

Determine the limit by sketching an appropriate graph.

12) $\lim_{x \rightarrow -6^+} f(x)$, where $f(x) = \begin{cases} 2x & -6 \leq x < 0, \text{ or } 0 < x \leq 3 \\ 2 & x = 0 \\ 0 & x < -6 \text{ or } x > 3 \end{cases}$

12) _____

Find the limit.

13) $\lim_{x \rightarrow 1^+} \frac{\sqrt{3x(x-1)}}{|x-1|}$

13) _____

Find the limit using $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$.

14) $\lim_{x \rightarrow 0} \frac{x}{\sin 3x}$

14) _____

- A) 1 B) $\frac{1}{3}$ C) 3 D) does not exist

Find the intervals on which the function is continuous.

15) $y = \frac{2}{x^2 - 16}$

15) _____

$$16) y = \sqrt{x^2 - 2}$$

16) _____

Find the limit and determine if the function is continuous at the point being approached.

$$17) \lim_{x \rightarrow \pi/2} \cos(3x - \cos 3x)$$

17) _____

- A) does not exist; no
C) does not exist; yes

- B) 0; yes
D) 0; no

Divide numerator and denominator by the highest power of x in the denominator to find the limit.

$$18) \lim_{x \rightarrow \infty} \sqrt{\frac{25x^2}{3 + 36x^2}}$$

18) _____

$$19) \lim_{t \rightarrow \infty} \frac{\sqrt{4t^2 - 8}}{t - 2}$$

19) _____

$$20) \lim_{x \rightarrow \infty} \frac{5x + 7}{\sqrt{7x^2 + 1}}$$

20) _____

$$21) \lim_{x \rightarrow \infty} \frac{4x^{-1} + 5x^{-3}}{2x^{-2} + x^{-5}}$$

21) _____

Find the limit using $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$.

$$22) \lim_{x \rightarrow 0} \frac{\sin x \cos 4x}{x + x \cos 5x}$$

22) _____

A) $\frac{4}{5}$

B) does not exist

C) $\frac{1}{2}$

D) 0

Find the limit.

$$23) \lim_{x \rightarrow \infty} \frac{\cos 5x}{x}$$

23) _____

A) ∞

B) 5

C) 0

D) 1

$$24) \lim_{x \rightarrow \infty} \frac{4x + 1}{14x - 7}$$

24) _____

A) 0

B) $\frac{2}{7}$

C) $-\frac{1}{7}$

D) ∞

$$25) \lim_{x \rightarrow \infty} \frac{4x^3 - 4x^2 + 3x}{-x^3 - 2x + 6}$$

25) _____

A) ∞

B) -4

C) 4

D) $\frac{3}{2}$

26) $\lim_{x \rightarrow 8^-} \frac{1}{x - 8}$ 26) _____
 A) ∞ B) -1 C) ∞ D) 0

27) $\lim_{x \rightarrow 2^-} \frac{4}{x^2 - 4}$ 27) _____
 A) 1 B) 0 C) $-\infty$ D) ∞

28) $\lim_{x \rightarrow 9^+} \frac{1}{(x - 9)^2}$ 28) _____
 A) 0 B) -1 C) $-\infty$ D) ∞

29) $\lim_{x \rightarrow 1^+} \frac{x^2 - 5x + 4}{x^3 - x}$ 29) _____
 A) ∞ B) ∞ C) 0 D) $-\frac{3}{2}$

30) $\lim_{x \rightarrow \infty} \sqrt{x^2 + 18x} - x$ Hint: Try multiplying and dividing by the conjugate 30) _____
 A) 0 B) 9 C) ∞ D) 18

31) $\lim_{x \rightarrow \infty} (0.1)^x$ 31) _____
 A) 1 B) 0 C) 10 D) does not exist

32) $\lim_{x \rightarrow \infty} \sqrt{x^2 + 2x} - \sqrt{x^2 - 8x}$ Hint: Try multiplying and dividing by the conjugate 32) _____
 A) does not exist B) 5 C) -3 D) 10

33) $\lim_{x \rightarrow \infty} (k)^{1/x}$ 33) _____
 A) 1 B) 0 C) does not exist D) ∞

Answer Key

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- 1) $\frac{10}{\pi}$
- 2) ~~does not exist~~ a) 1 b) -1 c) DNE d) 0
- 3) -2808
- 4) -7
- 5) $\frac{4}{3}$
- 6) ~~0~~ Right answer to 6) is -1
- 7) 13
- 8) $\delta = 0.505$
- 9) $\delta = 0.4375$
- 10) $\delta = 0.0025$
- 11) $L = 18$; $\delta = 0.03$
- 12) -12
- 13) $\sqrt{3}$
- 14) B
- 15) discontinuous only when $x = -4$ or $x = 4$
- 16) continuous on the intervals $(-\infty, -\sqrt{2}]$ and $[\sqrt{2}, \infty)$
- 17) B
- 18) $\frac{5}{6}$
- 19) 2
- 20) $\frac{5}{\sqrt{7}}$
- 21) ∞
- 22) C
- 23) C
- 24) B
- 25) B
- 26) A
- 27) C
- 28) D
- 29) D
- 30) B
- 31) B
- 32) B
- 33) A