

Unit 1 Review 2 – Limits

1. $\lim_{x \rightarrow \infty} \sin(x)$

2. $\lim_{x \rightarrow 0} \sin(x)$

3. $\lim_{y \rightarrow 4} \frac{4-y}{2-\sqrt{y}}$

4. $\lim_{x \rightarrow 5} \frac{x-5}{x-5}$

5. $\lim_{x \rightarrow \infty} \frac{6x^2-12}{3+4x-x^2}$

6. $\lim_{x \rightarrow 2} \frac{x^2-4x+4}{x^2+x-6}$

7. $\lim_{x \rightarrow \infty} \frac{\sqrt{5x^2-2}}{x+3}$

8. $\lim_{x \rightarrow 8} \frac{1}{x-8}$

9. $\lim_{x \rightarrow -1} \frac{x^2+6x+5}{x^2-3x-4}$

10. $\lim_{x \rightarrow 3} \frac{x^2-2x}{x+1}$

11. $\lim_{x \rightarrow \infty} \frac{5^{-x}}{5^{x+4}}$

12. $\lim_{x \rightarrow \infty} \frac{16-9x^2}{18x^2-36}$

13. Let $f(x) = \begin{cases} x-1, & x \leq 3 \\ 3x-7, & x > 3 \end{cases}$. Find:

a) $\lim_{x \rightarrow 3^-} f(x)$

b) $\lim_{x \rightarrow 3^+} f(x)$

c) $\lim_{x \rightarrow 3} f(x)$

14. Let $h(x) = \begin{cases} x^2-2x+1, & x \neq 3 \\ 7, & x = 3 \end{cases}$

a) Does $h(3)$ exist?

b) Does $\lim_{x \rightarrow 3} h(x)$ exist?

c) Is $h(x)$ continuous?

15. If $f = \begin{cases} \frac{x^2-9}{x+3}, & x \neq -3 \\ k, & x = -3 \end{cases}$. Find k so that $f(x)$ is continuous.

16. Let $f(x) = \begin{cases} x^2, & x \leq -1 \\ ax + b, & -1 < x < 1 \\ -x^2, & x \geq 1 \end{cases}$. Find a and b so that $f(x)$ is continuous.

17. Which of the following limits exist?

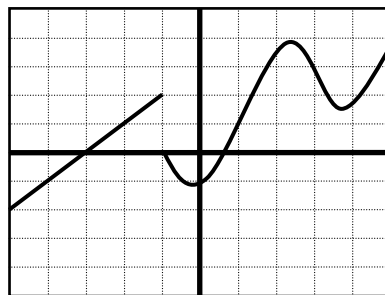
a) $\lim_{x \rightarrow 0} \tan(x)$ b) $\lim_{x \rightarrow 1} \frac{1}{x-1}$ c) $\lim_{x \rightarrow \infty} \cos(x)$ d) $\lim_{x \rightarrow 0} \frac{x^2 - 5x}{x}$

18. Which of the following are not continuous everywhere?

a) $y = \frac{1}{x^2}$ b) $y = |5 - x^2|$ c) $y = \frac{x^2 - 9}{x^2 - 5x + 6}$ d) $y = \sqrt{x^2 - 16}$

19. Let $f(x) = \begin{cases} 7x - 2, & x \leq 1 \\ kx^2, & x > 1 \end{cases}$. Find the value of k so that $f(x)$ is continuous.

20. If $f(x)$ is given by the following graph, find



a) $\lim_{x \rightarrow -1} f(x) =$ b) $\lim_{x \rightarrow 1} f(x) =$ c) $\lim_{x \rightarrow 3^-} f(x) =$

21. Use the definition of continuity to determine whether $f(x)$ is continuous at a for

$$f(x) = \frac{x+5}{x-5} \text{ for } a = 5$$

Answer Key:

1. DNE
2. 0
3. 4
4. 1
5. -6
6. 0
7. $+\sqrt{5}$
8. DNE
9. $-\frac{4}{5}$
10. $\frac{3}{4}$
11. 0
12. $-\frac{1}{2}$
13. a) 2
b) 2
c) 2
14. a) 7
b) 4
c) No
15. $k = -6$
16. $a = -1, b = 0$
17. a and d
18. a, c and d
19. $k = 5$
20. a) DNE
b) 1
c) 3
21. Not continuous at 5.