Limits Set 3

… Answers are after each page of problems

Find the limit. Draw a sketch for each problem. Do not use your calculator.

1. $\lim_{x\to 1^+} \frac{1}{x-1} =$

2. $\lim_{x\to 1} \frac{1}{x-1} =$

3. $\lim_{x\to -3} \frac{1}{(x+3)^2} =$

4. $\lim_{x\to 5^-} \frac{1}{5-x} =$

5. $\lim_{x\to 5^-} \frac{1}{(5-x)^2} =$

6. $\lim_{x\to 2} \frac{-1}{(x-2)^2} =$

7. $\lim_{x\to 3} \frac{|x-3|}{x-3} =$

8. $\lim_{x\to 2} 1 =$

9. $\lim_{x\to 2^+} \frac{x^3|x-2|}{x-2} =$

10. $\lim_{x\to 4^-} \frac{x^3-4}{x-4} =$

11. $f(x) = \begin{cases} x^2-1 \text{ if } x<2 \\ 3x-2 \text{ if } x>2 \end{cases}$

   a) $\lim_{x\to 2^-} f(x) =$

   b) $\lim_{x\to 2^+} f(x) =$

   c) $\lim_{x\to 2} f(x) =$

12. $\lim_{x\to 3^+} \left(x-3-\frac{1}{x-3} \right) =$

13. $g(x) = \begin{cases} x-3 \text{ if } x\neq 1 \\ 4 \text{ if } x=1 \end{cases}$ $\lim_{x\to 1} g(x) =$

14. $h(x) = \begin{cases} x+3 \text{ if } x<1 \\ 3x^2+1 \text{ if } x>1 \end{cases}$ $\lim_{x\to 1} h(x) =$

15. $\lim_{x\to \frac{\pi}{2}^+} \tan x =$

16. $\lim_{x\to -\frac{\pi}{2}^+} \sec x =$

17. $\lim_{x\to \pi^-} \csc x =$

18. $\lim_{x\to 0^-} \cot x =$

Limits Set 3

… Answers are after each page of problems

Answers

Worksheet 2 on Limits

1. ∞
2. dne
3. ∞
4. ∞
5. ∞
6. $-\infty$
7. 1
8. dne
9. 8
10. ∞
11. (a) 3
    (b) 4
    (c) dne
12. $-\infty$
13. -2
14. 4
15. $-\infty$
16. ∞
17. ∞
18. $-\infty$

Limits Set 3
… Answers are after each page of problems

On problems 19 - 24:

(a) find $\lim_{x\to\infty} f(x)$

(b) find $\lim_{x\to-\infty} f(x)$

(c) identify all horizontal asymptotes.

Use your graphing calculator on problems 23 and 24.

19. $f(x)=\dfrac{3x^3-x+1}{x+3}$

20. $f(x)=\dfrac{4x^2-3x+5}{2x^3+x-1}$

21. $f(x)=\dfrac{3x+1}{x-4}$

22. $f(x)=\dfrac{3x+1}{|x|+2}$

Hint on 22: Use the definition of absolute value, $|x|=\begin{cases} x \text{ if } x\geq 0 \\ -x \text{ if } x<0 \end{cases}$

23. $f(x)=\dfrac{\sin(3x)}{x}$

24. $f(x)=\cos\left(\dfrac{1}{x}\right)$

Limits Set 3

… Answers are after each page of problems

Answers

Worksheet 2 on Limits

19. (a) ∞

    (b) ∞

    (c) no horizontal asymptotes

20. (a) 0

    (b) 0

    (c) $y = 0$

21. (a) 3

    (b) 3

    (c) $y = 3$

22. (a) 3

    (b) -3

    (c) $y = 3$ and $y = -3$

23. (a) 0

    (b) 0

    (c) $y = 0$

24. (a) 1

    (b) 1

    (c) $y = 1$