

For numbers 1 – 2, construct a table to find the indicated limit.

1. $\lim_{x \rightarrow 2} (x^2 - 1)$

x	y
1.99	2.9601
1.999	2.996
1.9999	2.9996
2.0001	3.0004
2.001	3.004
2.01	3.0401

3

2. $\lim_{x \rightarrow -5} \frac{x^2 - 25}{x + 5}$

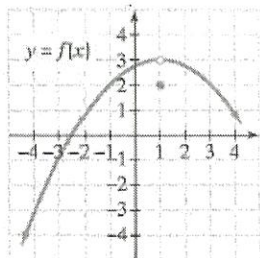
x	y
-5.0001	-10.0001
-5.001	-10.001
-5.01	-10.01
-4.9999	-9.9999
-4.999	-9.999
-4.99	-9.99

-10

For numbers 3 – 7, use the graph of f to find the indicated limits.

3. a) $\lim_{x \rightarrow 1} f(x)$

3



4. a) $\lim_{x \rightarrow 2} f(x)$

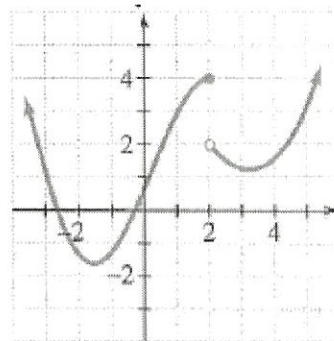
4

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

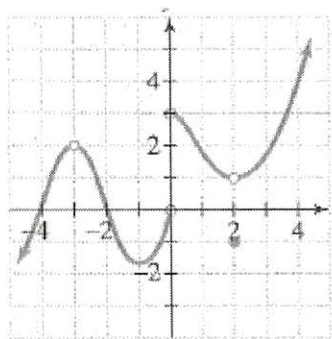
2

c) $\lim_{x \rightarrow 2^-} f(x)$

DNE



5.



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

2

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

2

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

2

d) $\lim_{x \rightarrow 0^-} f(x)$

0

e) $\lim_{x \rightarrow 0^+} f(x)$

3

f) $\lim_{x \rightarrow 0} f(x)$

DNE

g) $\lim_{x \rightarrow 2^-} f(x)$

1

h) $\lim_{x \rightarrow 2^+} f(x)$

1

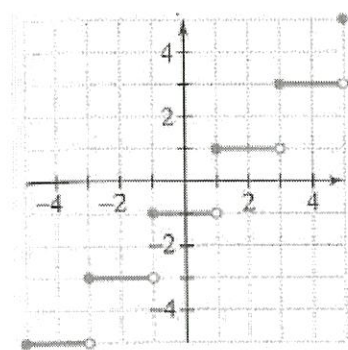
i) $\lim_{x \rightarrow 2} f(x)$

1

j) $f(2)$

-1

6.



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

1

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

3

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

DNE

d) $f(3)$

3

e) $\lim_{x \rightarrow 3.5^-} f(x)$

3

f) $\lim_{x \rightarrow 3.5^+} f(x)$

3

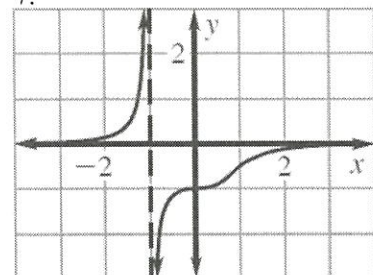
g) $\lim_{x \rightarrow 3.5} f(x)$

3

h) $f(3.5)$

3

7.



a) $\lim_{x \rightarrow -1^-} f(x)$

∞

b) $\lim_{x \rightarrow -1^+} f(x)$

$-\infty$

c) $\lim_{x \rightarrow -1} f(x)$

DNE

d) $\lim_{x \rightarrow \infty} f(x)$

0

e) $\lim_{x \rightarrow \infty} f(x)$

0

For numbers 8 – 23, use properties of limits to find the indicated limit. It may be necessary to rewrite an expression before limit properties can be applied.

8. $\lim_{x \rightarrow 3} (-6)$ -6

9. $\lim_{x \rightarrow 3} x$ 3

10. $\lim_{x \rightarrow -3} 5x^2$ 45

11. $\lim_{x \rightarrow 4} (6x - 21)^3$ 27

12. $\lim_{x \rightarrow -1} \sqrt{5x^2 + 4}$ 3

13. $\lim_{x \rightarrow 3} \frac{x^2 - 4}{x - 2}$ 5

14. $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2} \frac{0}{0}$

$$\frac{(x-2)(x+2)}{(x-2)}$$
 4

15. $\lim_{x \rightarrow 3} \frac{4x - 12}{x - 3} \frac{0}{0}$

$$\frac{4(x-3)}{x-3}$$
 4

16. $\lim_{x \rightarrow 3} \frac{x^2 - x - 6}{x^2 - 9} \frac{0}{0}$

$$\frac{(x-3)(x+2)}{(x-3)(x+3)}$$
 $\frac{5}{6}$

17. $\lim_{x \rightarrow -1} \frac{x^3 + 2x^2 + x}{x^4 + x^3 + 2x + 2} \frac{0}{0}$

$$\frac{x(x+1)(x+1)}{(x^3+2)(x+1)}$$
 0

18. $\lim_{x \rightarrow 7} \frac{4x^2 + 2x - 4}{x - 7}$
DNE
 $L \neq R$

19. $\lim_{x \rightarrow 100} \frac{\sqrt{x} - 10}{x - 100} \frac{0}{0} \begin{matrix} (\sqrt{x}+10) \\ (\sqrt{x}+10) \end{matrix}$

$$\frac{x - 100}{(\sqrt{x}-10)(\sqrt{x}+10)}$$
 $\frac{1}{20}$

20. $\lim_{x \rightarrow 4} \frac{4x^2 - 64}{2\sqrt{x} - 4} \frac{0}{0} \begin{matrix} (2\sqrt{x}+4) \\ (2\sqrt{x}+4) \end{matrix}$

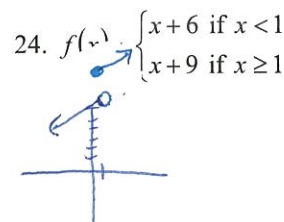
$$\frac{4(x-4)(x+4)}{4x-16}$$
 64

21. $\lim_{x \rightarrow \infty} \frac{3x^9}{4x^{10} + 1}$ 0

22. $\lim_{x \rightarrow \infty} \frac{6x^{14} + 5x}{8x^{14}}$ $\frac{3}{4}$

23. $\lim_{x \rightarrow -\infty} (-4x^2 + 3x + 6)$
-∞

For numbers 24 – 25, a piecewise function is given. Determine the indicated limit, or state that the limit does not exist.



a) $\lim_{x \rightarrow 1^-} f(x)$ 7

b) $\lim_{x \rightarrow 1^+} f(x)$ 10

c) $\lim_{x \rightarrow 1} f(x)$
DNE

25. $f(x) = \begin{cases} x^2 + 6 & \text{if } x < 2 \\ x^3 + 2 & \text{if } x \geq 2 \end{cases}$

a) $\lim_{x \rightarrow 2^-} f(x)$ 10

b) $\lim_{x \rightarrow 2^+} f(x)$ 10

c) $\lim_{x \rightarrow 2} f(x)$ 10