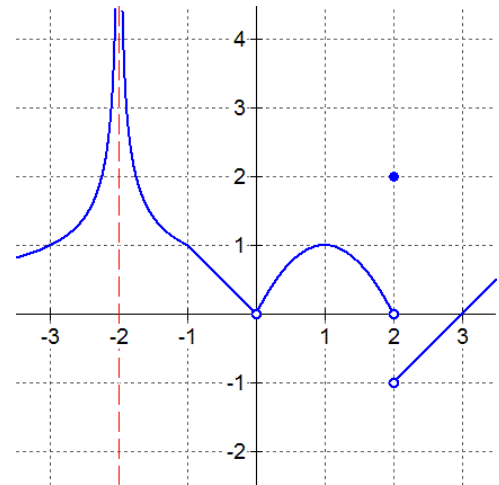


Example Technology Exercise 1

John Smith and Tom Brown

1. Use the figure to find the following.



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

b. $f(0)$

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

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

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

f. $f(2)$

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

h. $f(-2)$

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

j. $f(1)$

k. Is f continuous at $x = -2$?

l. Is f continuous at $x = 0$?

m. Is f continuous at $x = 1$?

2. Find the following limits numerically.

a. $\lim_{x \rightarrow 3} \frac{1}{x+3}$

2.9	2.99	2.999	2.9999	3.0001	3.001	3.01	3.1

b. $\lim_{x \rightarrow 0} \frac{1}{x}$

-0.1	-0.01	-0.001	-0.0001	0.0001	0.001	0.01	0.1

c. $\lim_{x \rightarrow 4} f(x)$, where $f(x) = \begin{cases} x+1, & x < 4 \\ 3-x, & x \geq 4 \end{cases}$

3.9	3.99	3.999	3.9999	4.0001	4.001	4.01	4.1

3. See Maxima file.

Answers

- 1 a) 0 b) undefined c) 0 d) -1 e) DNE
 f) 2 g) ∞ h) undefined i) 1 j) 1
 k) no l) no m) yes

2a The limit 0.166666... or 1/6

2.9	2.99	2.999	2.9999	3.0001	3.001	3.01	3.1
0.169492	0.166945	0.166694	0.166669	0.166664	0.166639	0.166389	0.163934

2b The limit from the left is $-\infty$ but the limit from the right is ∞ so the two-sided limit does not exist

-0.1	-0.01	-0.001	-0.0001	0.0001	0.001	0.01	0.1
-10	-100	-1000	-10000	10000	1000	100	10

2c The limit from the left is 5 but the limit from the right is -1 so the two-sided limit does not exist.

3.9	3.99	3.999	3.9999	4.0001	4.001	4.01	4.1
4.9	4.99	4.999	4.9999	-1.0001	-1.001	-1.01	-1.1