

Rates of change and limits

MTH 201 – Module 1B part 2

Today

- Review of the concept of limits
- Finding instantaneous velocity and rate of change using limits
- Feedback



As you approach
a along the x-axis

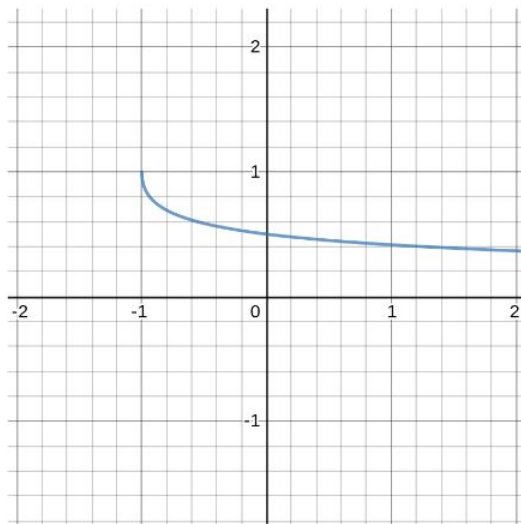
function

$$\lim_{x \rightarrow a} f(x) = L$$

What is the y-value getting closer to?

The diagram illustrates the components of the limit notation $\lim_{x \rightarrow a} f(x) = L$. A red arrow points from the text 'As you approach a along the x-axis' to the expression $x \rightarrow a$. A green arrow points from the text 'function' to the $f(x)$ part of the expression. A purple arrow points from the text 'What is the y-value getting closer to?' to the L on the right side of the equation.

Consider the function $f(x) = \frac{\sqrt{x+1}-1}{x}$. Its graph is shown here. The value of $\lim_{x \rightarrow 0} f(x)$ is



0, because plugging in $x = 0$ gives $0/0$

1, because plugging in $x = 0$ gives $0/0$

Undefined, because plugging in $x = 0$ gives $0/0$

0.5

None of these



function

As you approach a along the x-axis

$$\lim_{x \rightarrow a} f(x) = L$$

What is the y-value getting closer to?

x	-0.5	-0.1	-0.01	-0.001	0.001	0.01	0.1	0.5
f(x)	0.5857864376	0.5131670195	0.5012562893	0.5001250625	0.4998750625	0.4987562112	0.4880884817	0.4494897428





Connecting limits to rates of change
student.desmos.com

<http://gvsu.edu/s/1zJ>