Lecture Notes

08/21/2020

1 Functions and Limits

1.1 Definition of Limit

Limit - $\lim_{x \to a} f(x) = L$ "The limit of f of x as x approaches a"
We are concerned about the points that are around a, not a itself. In other words: a can be undefined.
For a limit to exist, both left and right limits MUST converge on the SAME point. Mathematically: $lim_{x \to a^-} f(x) = \lim_{x \to a^+} f(x)$ where a^- are numbers less than a and a^+ are numbers slightly larger than a.
Limits must also not approach infinity to exist.

1.1.1 Exambles of Solving Limits Numerically

$\lim_{x \to 2} \frac{x^2+x+2}{x+1}$

$\frac{\lim_{x \to 2} x^2+x+2}{\lim_{x \to 2} x+1} \to \frac{2^2+2+2}{2+1} \to \frac{8}{3}$

1.2 Evaluating Limits Numerically

$\lim_{x \to -4} \frac{x^2-16}{x+4}$
To solve this numerically, you need to plug in numbers that are above and below -4.
You end up getting something like -8.
Limits can also be evaluated graphically.