

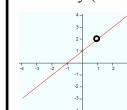
Continuity

A function $f(x)$ is said to be continuous at some point $x=c$ if $\lim_{x \rightarrow c} f(x) = f(c)$.

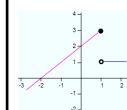
3 Conditions for Continuity

- 1.) $f(x)$ must be defined at point c (c is part of the domain of $f(x)$)
- 2.) The limit of $f(x)$ exists at c ($LHL = RHL$)
- 3.) The limit of $f(x)$ at c is equal to the function value at c

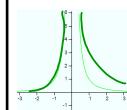
Continuity (Cont.)



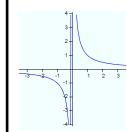
1.) $f(c)$ not def.



- 1.) ✓
2.) $LHL \neq RHL$



1.) X



Example #1

Determine where the following function is continuous.

$$g(x) = \begin{cases} -2x - 6 & x < -1 \\ 2 & x = -1 \\ \frac{x^2 + 2x - 3}{x - 1} & x > -1, x \neq 1 \end{cases}$$

- $f(x)$ cont. for $\mathbb{R} \setminus \{-1, 1\}$
- $f(x)$ not cont. at $x = -1, 1$

Asymptotes of rational functions of the form:

$$\frac{p(x)}{q(x)}$$

$p(x)$ and $q(x)$ are polynomials

Vertical Asymptotes

Set denominator = 0 and solve

Horizontal Asymptotes

Compare degrees of numerator and denominator

1. If bottom > top H.A. @ $y=0$
2. If bottom = top H.A. @ $y=k$,
 k = quotient of leading coefficients
3. If top > bottom No H.A.

x-intercepty-intercept

Set numerator = 0 Plug in $x=0$ and find y -value

Limits to Infinity

$$f(x) = \frac{1}{x^2 + 1}$$

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

$$\lim_{x \rightarrow -\infty} f(x) = 0$$

$$f(x) = \frac{x}{x^2 + 1}$$

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

$$\lim_{x \rightarrow -\infty} f(x) = 0$$

Homework

1E p.27-29 #1-5

- #1 All
- #2,3 Green
- #4 Blue
- #5 Red