11.1a - Graphical Limits

What is a limit?

If a function's value (its ___-coordinate) gets closer & closer to a number L as x approaches a value c from the left and the right, we call L the limit of f(x) as x approaches c. (pg. 781)

$$\lim_{x \to c} f(x) = L$$

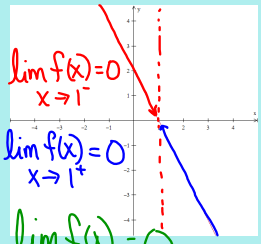
The following must be true for the limit to exist:

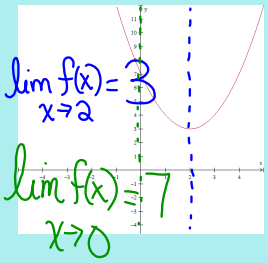
$\lim_{x \to c^-} f(x) = \lim_{x \to c^+} f(x)$ (from the left / from the right)

We can evaluate limits in 3 ways:
1) Graphically
2) Numerically (with a table)
3) Algebraically

Feb 24-11:32 AM

Find Limits - Graphically





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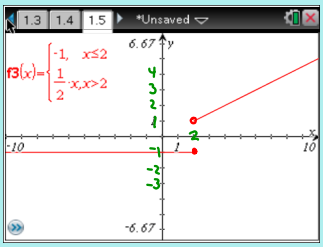
Limits that "Fail to Exist" or (Do Not Exist - DNE)

1) F(x) approaches a different value from the left and right.



$\lim_{x \to 2^-} f(x) = 1$

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

$\lim_{x \to 2} f(x) = \text{DNE}$

$f(2) = 1$

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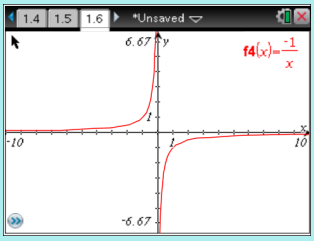
Limits that "Fail to Exist" or (Do Not Exist - DNE)

2) F(x) increases or decreases without bound (goes to ∞ or -∞) as x c.



$\lim_{x \to 0^-} f(x) = \infty$ DNE

$\lim_{x \to 0^+} f(x) = -\infty$ DNE

$\lim_{x \to 0} f(x) = \text{DNE}$

Note: Any time f(x) approaches $+\infty$ or $-\infty$ from any side, the limit DNE.

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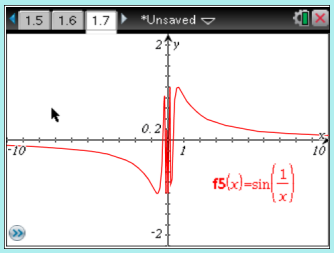
Limits that "Fail to Exist" or (Do Not Exist - DNE)

3) F(x) oscillates between two fixed values as x approaches c



$\lim_{x\to 0^-} f(x) =$ DNE

$\lim_{x\to 0^+} f(x) =$ DNE

$\lim_{x\to 0} f(x) =$ DNE

p. 784

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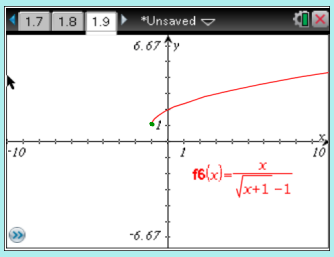
Limits that "Fail to Exist" or (Do Not Exist - DNE)

4) F(x) does not exist on one side of the x value that the graph is approaching.



$\lim_{x\to 1^-} f(x) =$ DNE

$\lim_{x\to 1^+} f(x) =$ 1

$\lim_{x\to 1} f(x) =$ DNE

$\lim_{x\to 0^-} f(x) =$ 2

$\lim_{x\to 0^+} f(x) =$ 2

$\lim_{x\to 0} f(x) =$ 2

$f(0) =$ 2

Feb 24-12:53 PM

HOMEWORK

...evaluating limits graphically

pages 1, 2, 4 in packet

Feb 24-4:04 PM

Grab a whiteboard, marker, and eraser and
Sketch a graph such that: $\lim_{x\to 3} f(x) = 2,$
$f(3) = dne$

Mar 25-2:14 PM

Sketch a graph such that: $\lim_{x\to 3^-} f(x) = 2,$
$\lim_{x\to 3^+} f(x) = dne$

Mar 25-2:15 PM

Sketch a graph such that: $\lim_{x\to 3^-} f(x) = 2,$
$\lim_{x\to 3^+} f(x) = -2,$
$f(3) = 4$

Mar 25-2:15 PM

Sketch a graph such that: $\lim_{x\to 3^-} f(x) = 2,$
$\lim_{x\to 3^+} f(x) = 2,$
$\lim_{x\to 3} f(x) = dne$

Mar 25-2:15 PM

Graphing Piecewise Functions

$$f(x) = \begin{cases} x^2 - 6x + 6, x \geq 1 \\ -4 + 4x, x < 1 \end{cases}$$

X	Y

Feb 24-4:44 PM

HOMEWORK

...evaluating limits graphically

pages 1-6 in packet
{packet due Friday}

Feb 24-4:04 PM