

Questions over 11.3a?

23, $f(x) = \frac{4}{x+1}$ $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$

① $f(x+h) = \frac{4(x+h)}{x+h+1} + \frac{-4(x+h)}{x+1} = \frac{4x+4}{(x+h+1)(x+1)} + \frac{-4x-4h-4}{(x+h+1)(x+1)}$

②

③ $\frac{-4h}{(x+h+1)(x+1)} \cdot \frac{1}{h} = \lim_{h \rightarrow 0} \frac{-4}{(x+h+1)(x+1)} = \frac{-4}{(x+1)^2} = f'(x)$

$f'(1) = \frac{-4}{(1+1)^2} = \frac{-4}{4} = -1$

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WARM UP

Answer the following questions on a clean sheet of paper; this will be the start of tonight's homework.

- Write the formula for $f'(x)$: $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$
- What does this give us in terms of the graph of $f(x)$? *Slope of tangent line*
- What do we call this new function (hint: starts with a "d")? *Derivative*

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Take a guess:

What would $f'(x)$ be for...

$f(x) = 2x + 3$ 2

$f(x) = -2x + 3$ -2

$f(x) = 4$ 0

$f(x) = 0.001$ 0

$x^2 \rightarrow \text{linear}$

$x^4 \rightarrow x^3$

$x^3 \rightarrow x^2$

p. 808, #27 (HW)

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Example

Find the slope of the graph at the given point, then find an equation of the tangent line to the graph at the point. Finally, graph your results. $x^2 - 3$

$f(x) = x^2 - 3$ at $(-1, -2)$

$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $\lim_{h \rightarrow 0} 2x+h$

$f(x+h) = (x+h)^2 - 3 = x^2 + 2xh + h^2 - 3 + (x^2 + 3)$

$= \frac{2xh + h^2}{h}$

$f'(x) = 2x$

$(-1, -2) f'(-1) = 2(-1) = -2$

$y + 2 = -2(x + 1)$

$f(x) = x^2 - 3$

$f'(x) = 2x$

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What would the GRAPH of $f'(x)$ ($f(x)=x^2-3$) look like? Hmm..

x	$f'(x)$	Meaning...?

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<http://www.flashandmath.com/mathlets/cal/derplot/derplot.html>

http://people.hofstra.edu/stefan_waner/calctopic1/derivgraphex.html

p. 810, #71 (HW)

$x^2 - 5$ $4x^2 + 3x$ $9x^3 - 2x$

$2x$ $8x + 3$ $27x^2 - 2$

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HOMWORK

...more derivatives!

11.3b (p808): 25-35 odd, 39, 40, 71-74 all

Monday: 4-question common assessment on limits

- Find a limit numerically
- Find a limit algebraically
- Find a limit graphically (piecewise)
- Find the derivative of a function

Mar 10-9:41 PM