

Thursday, January 24

from 1.3:

$$f(x) = \frac{2x+1}{5x+3}$$

$$\frac{5 \cdot 1}{5 \cdot 3} - \frac{1 \cdot 3}{5 \cdot 3}$$

$$\frac{5}{15} - \frac{3}{15} = \frac{5-3}{15}$$

$$M_{SEC} = \frac{f(x+h) - f(x)}{h} \quad (\text{AVE. RATE OF CHANGE})$$

$$M_{SEC} = \frac{\frac{2(x+h)+1}{5(x+h)+3} - \frac{2x+1}{5x+3}}{h}$$

$$= \left(\frac{[2(x+h)+1](5x+3)}{[5(x+h)+3](5x+3)} - \frac{(2x+1)[5(x+h)+3]}{(5x+3)[5(x+h)+3]} \right) \cdot \frac{1}{h}$$

$$= \left[\frac{(2x+2h+1)(5x+3)}{[5(x+h)+3](5x+3)} - \frac{(2x+1)(5x+5h+3)}{(5x+3)[5(x+h)+3]} \right] \cdot \frac{1}{h}$$

$$= \frac{(2x+2h+1)(5x+3) - (2x+1)(5x+5h+3)}{[5(x+h)+3](5x+3) \cdot h}$$

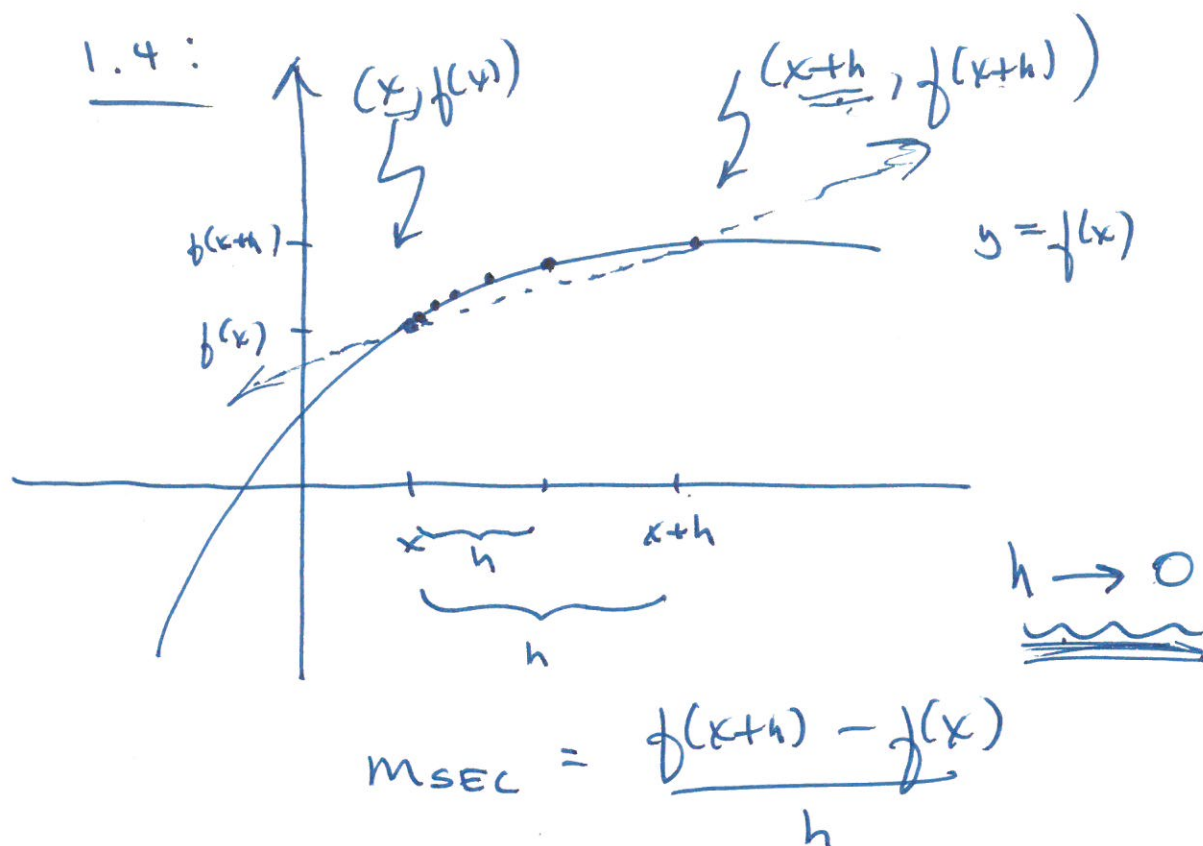
$$= \frac{(10x^2 + 10xh + 5x + 6x + 6h + 3) - (10x^2 + 10xh + 6x + 5x + 5h + 3)}{[5(x+h)+3](5x+3) \cdot h}$$

$$= \frac{10x^2 + 10xh + 11x + 6h + 3 - 10x^2 - 10xh - 11x - 5h - 3}{[5(x+h)+3](5x+3) \cdot h}$$

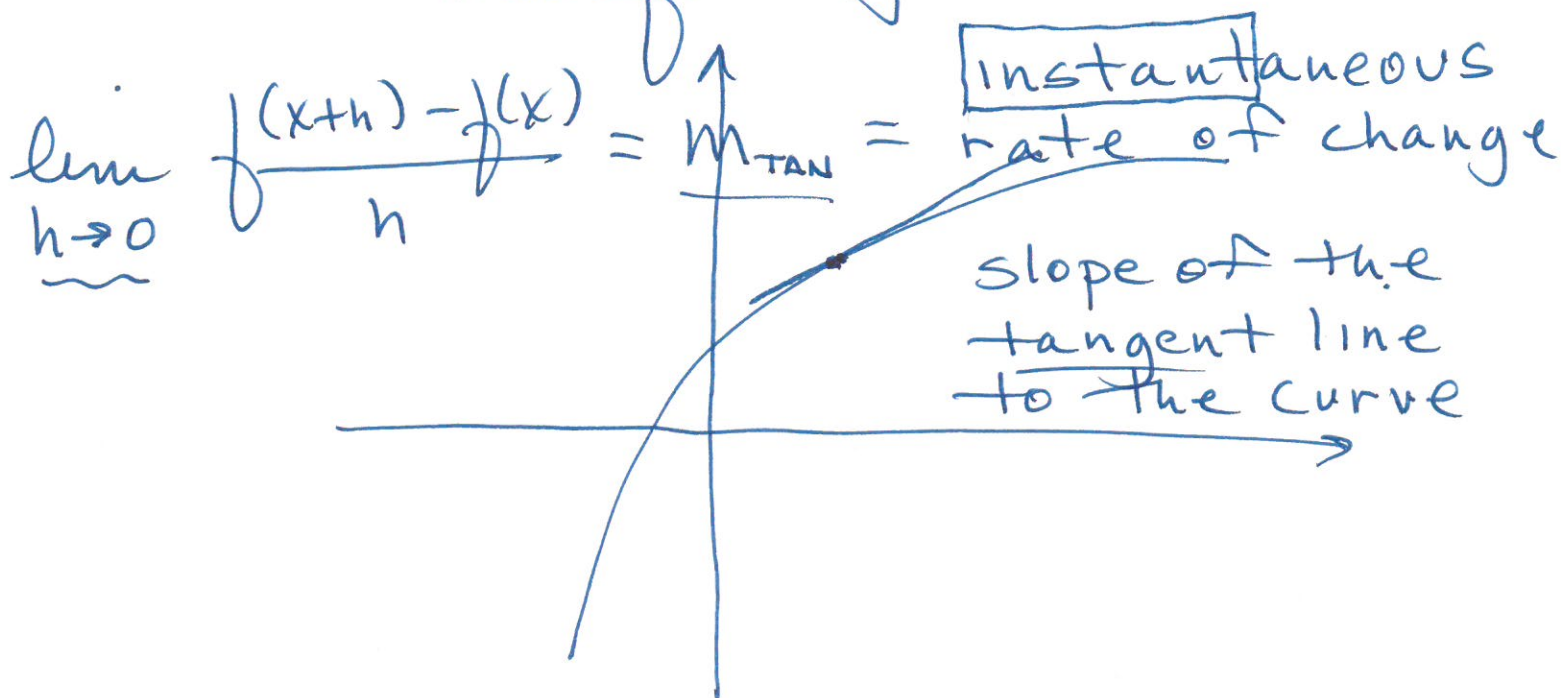
$\begin{cases} x = \text{initial } x \\ h = \text{change in } x \end{cases}$

$$\frac{1}{[5(x+h)+3](5x+3)} = \frac{1}{[5(x+h)+3](5x+3)} \quad (h \neq 0)$$

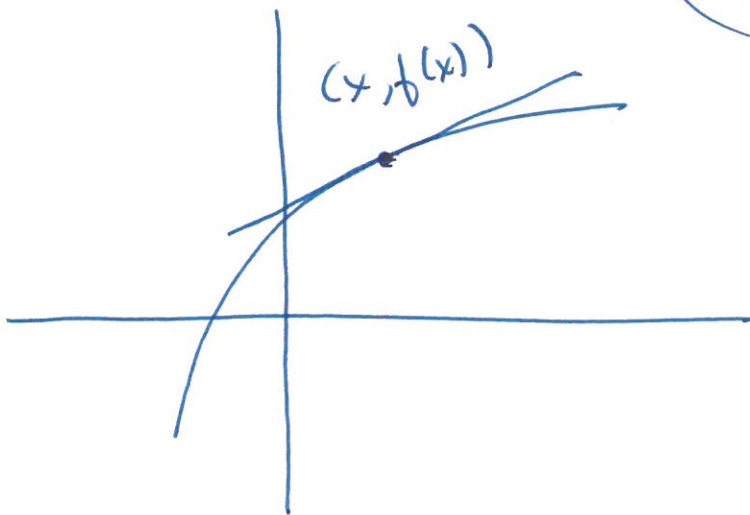
(2)



as $h \rightarrow 0$, the 2nd point gets closer & closer to the first point



$$m_{\text{TAN}} = \lim_{h \rightarrow 0} \underbrace{\frac{f(x+h) - f(x)}{h}}_{\text{m SEC}} = \text{inst. rate of change} \quad (3)$$



$$f(x) = 5x^2 - 11x + 8$$

$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = m_{\text{TAN}}$$

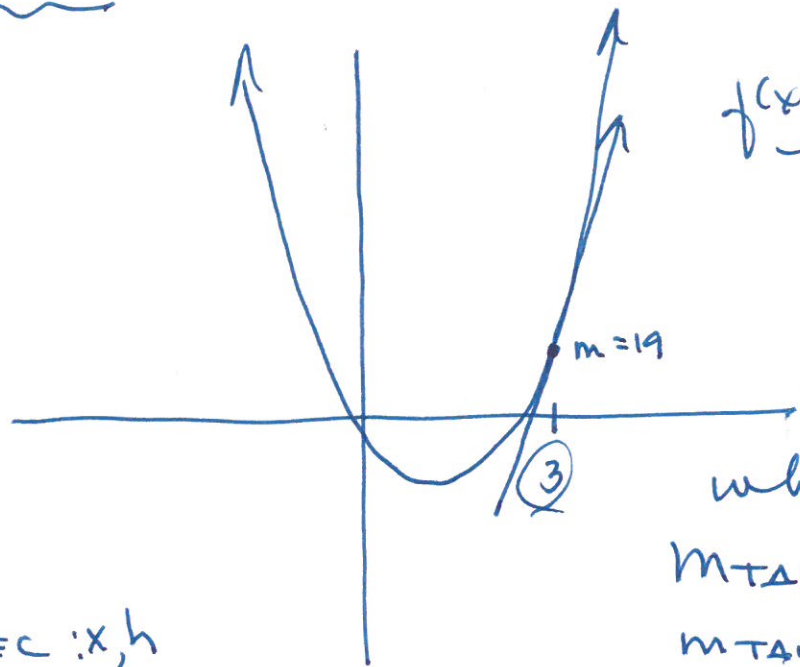
$$\lim_{h \rightarrow 0} \left[\frac{5(x+h)^2 - 11(x+h) + 8 - (5x^2 - 11x + 8)}{h} \right]$$

$$\lim_{h \rightarrow 0} \frac{5x^2 + 10xh + 5h^2 - 11x - 11h + 8 - 5x^2 + 11x - 8}{h}$$

$$\lim_{h \rightarrow 0} \frac{h(10x + 5h - 11)}{h} \quad (h \neq 0)$$

instantaneous rate of change

$$\lim_{h \rightarrow 0} (10x + \cancel{8h} - 11) = \underline{10x - 11} = m_{\text{TAN}}$$



$$f(x) = 5x^2 - 11x + 8$$

when $x = 3$

$$m_{\text{TAN}} = 10(3) - 11$$

$$m_{\text{TAN}} = 19$$

$m_{\text{SEC}}: x, h$
 $m_{\text{TAN}}: x$

$$f(x) = 5x^2 - 11x + 8 \quad \lim_{h \rightarrow 0} \quad f'(x) = 10x - 11$$

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

{ DEFINITION
OF
DERIVATIVE }

f "prime" of x
DERIVATIVE

$$f(x) = \frac{2x+1}{5x+3} \quad f'(x) = \frac{1}{(5x+3)^2} \quad (5)$$

find $f'(x)$ (the deriv; M_{TAN} ; inst. rate of change)

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \quad \text{★} \quad (\text{DEF.})$$

$$f'(x) = \lim_{h \rightarrow 0} \left[\frac{\frac{2(x+h)+1}{5(x+h)+3} - \frac{2x+1}{5x+3}}{h} \right]$$

= (from earlier today)

$$f'(x) = \lim_{h \rightarrow 0} \left[\frac{1}{\left[\underset{0}{5(x+h)+3} \right] \cdot (5x+3)} \right]$$

$$f'(x) = \frac{1}{\left[\underline{5x+3} \right] \left(\underline{5x+3} \right)} = \frac{1}{(5x+3)^2} = M_{TAN}$$

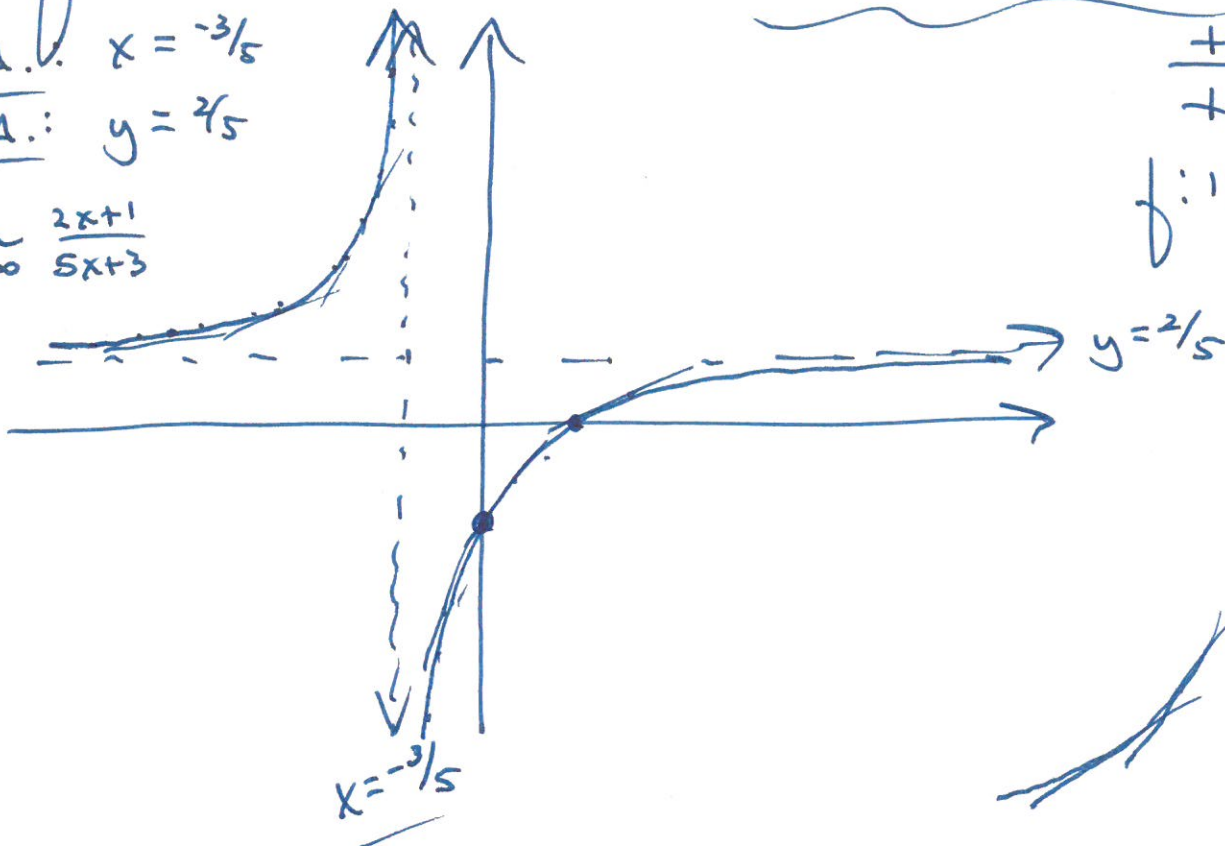
$$f(x) = \frac{2x+1}{5x+3}$$

$$f'(x) = \frac{1}{(5x+3)^2} = M_{\text{TAN}}$$

v.A.: $x = -3/5$

H.A.: $y = 2/5$

$$\lim_{x \rightarrow \infty} \frac{2x+1}{5x+3}$$



$$\frac{+}{+} = (+)$$

$f: \text{INCR.}$

Reschedule Assignments...

[Past (3) | Current/Recent (23) | Future | All Assignments]

[Low Detail | Medium | High]

Name					Category	Due
Intro to WebAssign	view	edit	schedule	scores	Homework	1-22-19 11:00 PM EST
Intro to Symbolic Questions	view	edit	schedule	scores	Homework	1-22-19 11:01 PM EST
Symbolic Questions (Part 2)	view	edit	schedule	scores	Homework	1-22-19 11:02 PM EST
Homework 1 .	view	edit	schedule	scores	Homework	1-31-19 01:30 PM EST
Homework 2 .	view	edit	schedule	scores	Homework	1-31-19 01:31 PM EST
→ Homework 3 .	view	edit	schedule	scores	Homework	1-31-19 01:32 PM EST
Practice Test 1 (opt.)	view	edit	schedule	scores	Homework	1-31-19 01:33 PM EST
Study for Test 1	view	edit	schedule	scores	→ Study Materials	1-31-19 01:34 PM EST
Homework 4 .	view	edit	schedule	scores	Homework	2-13-19 11:01 PM EST
Homework 5 .	view	edit	schedule	scores	Homework	2-20-19 11:02 PM EST
Practice Test 2 (opt.)	view	edit	schedule	scores	Homework	2-26-19 01:30 PM EST
Study for Test 2	view	edit	schedule	scores	→ Study Materials	2-26-19 01:31 PM EST
Homework 6 . ↗	view	edit	schedule	scores	Homework	3-6-19 11:00 PM EST
Homework 7 .	view	edit	schedule	scores	Homework	3-8-19 11:01 PM EST
Homework 8 .	view	edit	schedule	scores	Homework	3-22-19 11:02 PM EDT
Practice Test 3 (opt.)	view	edit	schedule	scores	Homework	3-28-19 01:30 PM EDT
Study for Test 3	view	edit	schedule	scores	→ Study Materials	3-28-19 01:31 PM EDT
Homework 9 . ↗	view	edit	schedule	scores	Homework	4-5-19 11:00 PM EDT
Homework 10 .	view	edit	schedule	scores	Homework	4-12-19 11:01 PM EDT
Practice Test 4 (opt.)	view	edit	schedule	scores	Homework	4-18-19 01:30 PM EDT
Study for Test 4	view	edit	schedule	scores	→ Study Materials	4-18-19 01:31 PM EDT
Homework 11 . ↗	view	edit	schedule	scores	Homework	4-24-19 11:00 PM EDT
Practice Final (opt.)	view	edit	schedule	scores	Homework	4-30-19 01:00 PM EDT
Propagate						

webassign due dates have
been changed
(as of 1/24/19)

Subject: All-In for Spring 2019

From: Isaac Pomper <ilpomper@ncsu.edu>

Date: 1/23/19, 2:04 PM

To: jrgriggs@ncsu.edu

121-002
S'19

Dr. Griggs,

I am writing to let you know how many of your students have chosen to get the e-book through our All-In program. Right now about 60% of your students have opted-in for the Spring semester. Students who have not purchased access by the deadline will lose their access to the e-book at that point.

Our deadline for opting-in for the semester is January 25th. Please let your students know they need to go ahead and purchase their access by that date. We will also be sending out a reminder e-mail this week to students who have not purchased access.

If you have any questions or feedback, please let me know.

Sincerely,
Isaac Pomper

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