1106 DIS 208 Week 7 (#1) 3/4/2020

Discussion Outline

- Prelim info
- Worksheets

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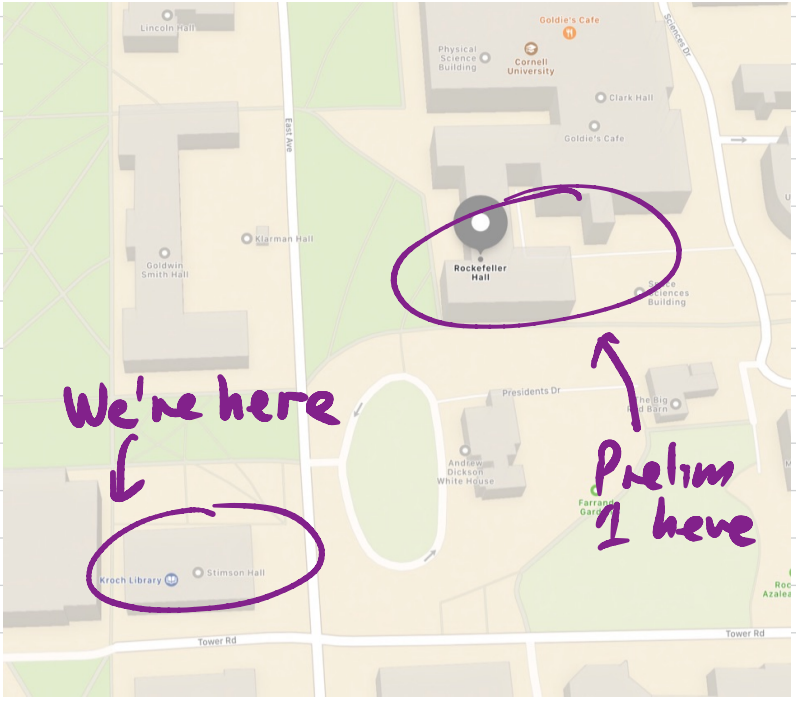
Office hours: 4:15–6:15 Thu

Upcoming Assessment

- Prelim 1! (Tuesday March 10th, 7:30pm, RCK 201)
- Weighting: 15%
- Course drop date:
  March 17
  (at least according to Registrar — check with specific college.)



Prelim 1 Study Resources include:

- 2019 exam (on Canvas)
- MATH1006 support course
- Office hours (now in combined schedule)
- Previous:
  - homework & solutions
  - recitations & solutions
  - quizzes & solutions
- Lectures & textbook

Last time: - Approximating derivative

This time: - Calculating the derivative for basic functions with rules

Recall: $\frac{d}{dx}\left(f(x) \cdot g(x)\right) \neq \frac{d}{dx}f(x) \cdot \frac{d}{dx}g(x)$

(Instead, $\frac{d}{dx}(f \cdot g) = \frac{df}{dx} \cdot g + f \cdot \frac{dg}{dx}$.)

Ex. $(3x)' = 3(x)'$

$= 3 \cdot 1$

$= 3.$

$(3)' \cdot x + 3 \cdot (x)'$

$= 0 \cdot x + 3 \cdot 1$

$= 0 + 3$

$= 3.$

$(u \neq 0)$

$(x^n)'$

$= n \cdot x^{n-1}$

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \cdots$$

$$= \cancel{1} + x + \frac{x^2}{2} + \frac{x^3}{6} + \frac{x^4}{24} + \cdots$$

$$(e^x)' = 1 + x + \frac{x^2}{2} + \frac{x^3}{6} + \cdots$$

$$(e^x)' = e^x$$

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

$$\left(\frac{x^2-1}{x+1}\right)' = (x-1)' = 1.$$

1: Sometimes things factor & make calculations easier.

Simplify $1 \cdot \frac{1}{2} \cdot \frac{2}{3} \cdot \frac{3}{4} \cdot \frac{4}{5} \cdots \frac{99}{100}$

$= \frac{1}{100}.$

$\frac{X+Y+Z}{X}$

incorrect!

example

$\frac{2+3}{2} = \frac{5}{2} = 2.5$ #!

$1 \quad \frac{2+3}{1\ 2} = \frac{1+3}{1} = 4$

$$\frac{x+y+z}{x} = \frac{1}{x}(x+y+z)$$

$$= \frac{1}{x}\cdot x + \frac{1}{x}\cdot y + \frac{1}{x}\cdot z$$

$$= 1 + \frac{y}{x} + \frac{z}{x}$$

$$\frac{x(xy+z+1)}{x} = \frac{x^2y + xz + x}{x} = \frac{xy+z+1}{1} = xy+z+1$$

Assume $f(x)$, $g(x)$, $h(x)$ have derivatives.

What is $(fgh)'$?

$$(fgh)' = ((fg)\cdot h)'$$

$$= (fg)'\cdot h + (fg)\cdot h'$$

$$= (f'g + fg')h + fgh'$$

$$= f'gh + fg'h + fgh'.$$

this should generalize ↪