MAT 125 Practice Lecture

~~10am~~

10:10am (to allow for people having difficulty joining).

Remote Learning Transition

* All lectures will be on Zoom at scheduled time.
* Likewise for OH.
* Homework as before.
* Exam will be given online, submitted electronically. Most likely same time as scheduled.

Asking questions in Lecture.

* Highly encourage turning on camera and mic!

* Click "Raise hand".
* Wait for me to unmute. Type/say question.

All notes and recordings will be uploaded, so I recommend not taking detailed notes.

Example

Use implicit differentiation to find $\frac{dy}{dx}$, if

$$y^2 + 2x^3 = 4y - 5x^2$$

Solution

Take $\frac{d}{dx}$ of both sides:

$$2y\frac{dy}{dx} + 6x^2 = 4\frac{dy}{dx} - 10x$$

Solve for $\frac{dy}{dx}$:

$$(2y-4)\frac{dy}{dx} = -10x - 6x^2$$

Therefore

$$\frac{dy}{dx} = \frac{-10x-6x^2}{2y-4}$$

* Check that you can access recording.

Example

If $2xy = x^2$

Find $\frac{dy}{dx}$.

$2x \cdot y(x) = x^2$

$f(x)g(x)$

product

Take $\frac{d}{dx}$ of both sides.

$$2\left(\frac{d}{dx}x\right)y + 2x\left(\frac{dy}{dx}\right) = 2x$$

$$\Rightarrow 2y + 2x\frac{dy}{dx} = 2x$$

Solve for $\frac{dy}{dx}$.

$$\frac{dy}{dx} = \frac{2x - 2y}{2x}.$$

We used the product rule:

if $f(x)$ and $g(x)$ are functions,

$$\frac{d}{dx}\, f(x)\cdot g(x) = \left(\frac{d}{dx}f(x)\right)\cdot g(x) + f(x)\frac{d}{dx}g(x).$$