$(fg)' = f'g + fg'$ $\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$

§2.4

Recall:

$\frac{d}{dx}[\sin(x)] = \cos(x)$ $\frac{d}{dx}[\csc(x)] = -\csc(x)\cot(x)$

$\frac{d}{dx}[\cos(x)] = -\sin(x)$ $\frac{d}{dx}[\sec(x)] = \sec(x)\tan(x)$

$\frac{d}{dx}[\tan(x)] = \sec^2(x)$ $\frac{d}{dx}[\cot(x)] = -\csc^2(x)$

$\frac{d}{dx}[x^2\sin(x)] = 2x\sin(x) + x^2\cos(x)$

I recommend the Theory Videos for §2.4

Derivative of sine, cosine and then we get the others for almost free.

https://harryzaims.com/public_html/201/videos/chapter-02/2-4/videos/00a-derivative-of-sine-proved.mp4

https://harryzaims.com/public_html/201/videos/chapter-02/2-4/videos/00b-derive-derivatives-of-OTHER-trig-functions.mp4

$\frac{d}{dx}[\csc(x)] = \frac{d}{dx}\left[\frac{1}{\sin(x)}\right] = \frac{d}{dx}\left[\frac{f}{g}\right] = \frac{f'g - fg'}{g^2}$

$= \frac{0\cdot\sin(x) - 1\cdot\cos(x)}{\sin^2(x)} = -\frac{\cos(x)}{\sin^2(x)} = -\frac{1}{\sin(x)}\cdot\frac{\cos(x)}{\sin(x)} = -\csc(x)\cot(x)$

Some Schedule Tweaks Were Performed, Today.

Looking ahead, it would be nice to squeeze 3.1 - 3.3 in before Spring Break. We get back from Spring Break on 3/24. The Midterm will be either Monday or Tuesday of the following week. That's 3/31 or 4/1, depending on your schedule.