Exam 2 FRQ musts

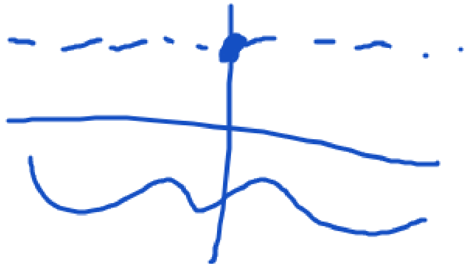
- Make sure to clearly show when you differentiate (ie write $f'(x)$ or y')!

e.g. $f(x) = x^3 - 3x + 1$

$$\boxed{f'(x)} = 3x^2 - 3$$

- Write tangent lines as equations unless told to do otherwise

ie horizontal tangent line at $y = 5$



HW 11 #10

$$3xe^{(x^2y^2)} = x^2$$

$$\frac{d}{dx}e^{\star} = e^{\star}\frac{d}{dx}e^{\star}$$

$$3e^{x^2y^2} + \underline{3x}\underbrace{\frac{d}{dx}e^{(x^2y^2)}} = 2x$$

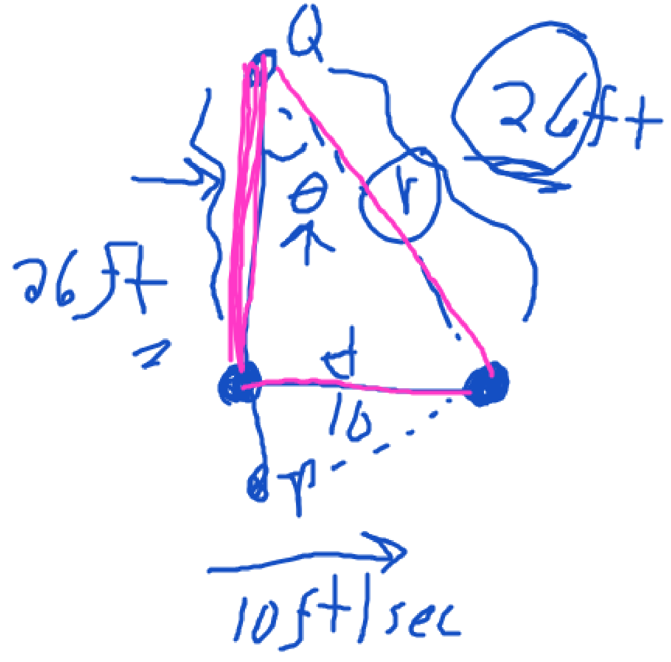
$$\underline{e^{x^2y^2}} \cdot \frac{d}{dx}(x^2y^2)$$

$$\left(2xy^2 + x^2 2y\frac{dy}{dx}\right)$$

$$3e^{x^2y^2} + 3xe^{x^2y^2}\left(2xy^2 + x^2 2y\frac{dy}{dx}\right) = 2x$$

$$\frac{dy}{dx} = \frac{\dfrac{2x - 3e^{x^2y^2}}{3xe^{x^2y^2}} - 2xy^2}{2x^2y}$$

HW 14 #4



$$\frac{d\theta}{dt} = ?$$

$$d = 10$$

$$r = 26$$

$$\frac{dd}{dt} = 10$$

$$\sin\theta = \frac{d}{26}$$

$$\cos\theta = \frac{24}{26}$$

$$\cos\theta \frac{d\theta}{dt} = \frac{1}{26} \cdot \frac{dd}{dt}$$

sohcahtoa

$$\frac{d\theta}{dt} = \frac{1}{26\cos\theta} \frac{dd}{dt} \leftarrow 10$$

$$26^2 = a^2 + 10^2$$

$$576 = a^2 \rightarrow a = 24$$

$$\frac{d\theta}{dt} = \frac{10}{\cancel{26}\left(\frac{24}{\cancel{26}}\right)} = \frac{10}{24} = \boxed{\frac{5}{12}}$$

a constant

$$\boxed{y = a^x} = a^x \ln(a)$$

① $\ln(y) = \ln(a^x)$

$$= x \ln(a)$$

$$\frac{1}{y} y' = \ln(a)$$

$$y' = y \ln(a)$$

$$y' = a^x \ln(a) \checkmark$$

HW 12 #8

$$y = \frac{\sqrt[3]{x-2}}{(1+x^2)^4}$$

$$\ln(y) = \ln\left(\frac{(x-2)^{1/3}}{(1+x^2)^4}\right)$$

$$= \ln\left((x-2)^{1/3}\right) - \ln\left((1+x^2)^4\right)$$

$$= \frac{1}{3}\ln(x-2) - 4\ln(1+x^2)$$

$$y' = y\left(\frac{1}{3}\frac{1}{x-2} - 4\frac{2x}{1+x^2}\right) = \boxed{\left(\frac{1}{3(x-2)} - \frac{8x}{1+x^2}\right)\frac{\sqrt[3]{x-2}}{(1+x^2)^4}}$$