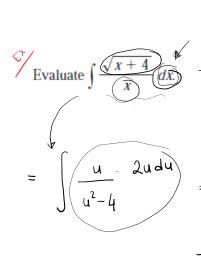
3rd Week Thursday





$$= \int \frac{2u^2}{u^2-4} du$$

$$\left(\frac{2u^2}{u^2-4} du \right) \longrightarrow$$

$$= \int 2 du + \int \frac{8}{u^2 - 4} du$$

$$= \int \frac{2u^2}{u^2-4} du \longrightarrow IRFBPF \nabla first apply poly division$$

$$= \int 2du + \int \frac{8}{u^2-4} du \longrightarrow 2 + \frac{8}{u^2-4}$$

$$= \int 2du + \int \frac{8}{u^2-4} du \longrightarrow 8$$

$$=2\sqrt{x+4}+2\ln\left|\frac{x+4-2}{x+4+2}\right|+C$$

$$\frac{8}{(u-2)(u+2)} = \frac{A}{u-2} + \frac{B}{u+2}$$

$$8 = Au + 2A + Bu - 2B$$

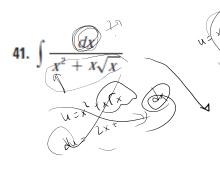
$$A+B = 0 2A-2B = 9 A=2-2$$

$$\int \frac{2}{u-2} du + \int \frac{-2}{u+2} du = 2 \ln |u-2| - 2 \ln |u+2|$$

$$\int \frac{2}{u-2} du + \int \frac{-2}{u+2} du$$

$$= 2 \ln |u-2| - 2 \ln |u+2|$$

$$2 \ln \left| \frac{u-2}{u+2} \right|$$



$$\frac{2udu}{u^4 + u^3} \xrightarrow{\text{conter of the subst}} \frac{u^4 = x^2}{u^3 = x/x}$$

$$u= (x) \longrightarrow u^2 = x$$

$$center of$$

$$the subst$$

$$u' = x$$

$$\int \frac{2}{a} dy$$

$$u^3 = x / x$$

$$\int \frac{2}{u^2(u+1)} du$$

$$\frac{2}{u^{2}(u+1)} du = \int \frac{A}{u} + \frac{B}{u^{2}} + \frac{C}{u+1}$$

$$2 = \underbrace{Au^{2} + Au + Bu + B}_{A+C=0} + Cu^{2}$$

$$A+C=0 \Rightarrow C=2$$

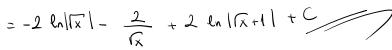
$$A+B=0 \Rightarrow A=-2$$

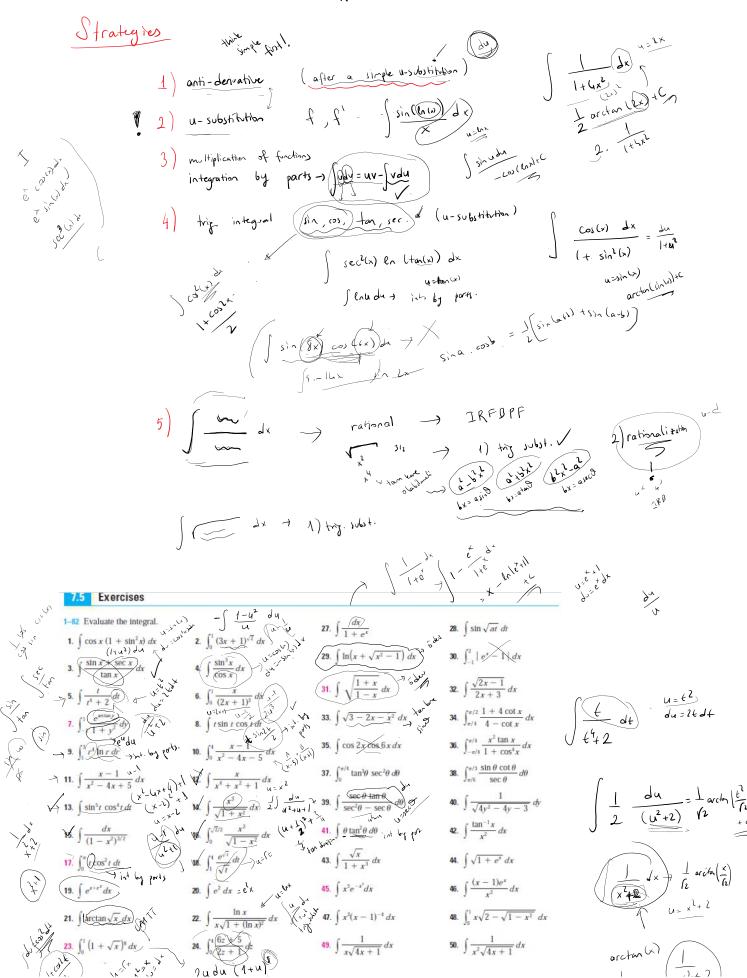
$$2 = \underbrace{Au^2 + Au + Bu + B}_{A+C=0} + Cu^2$$

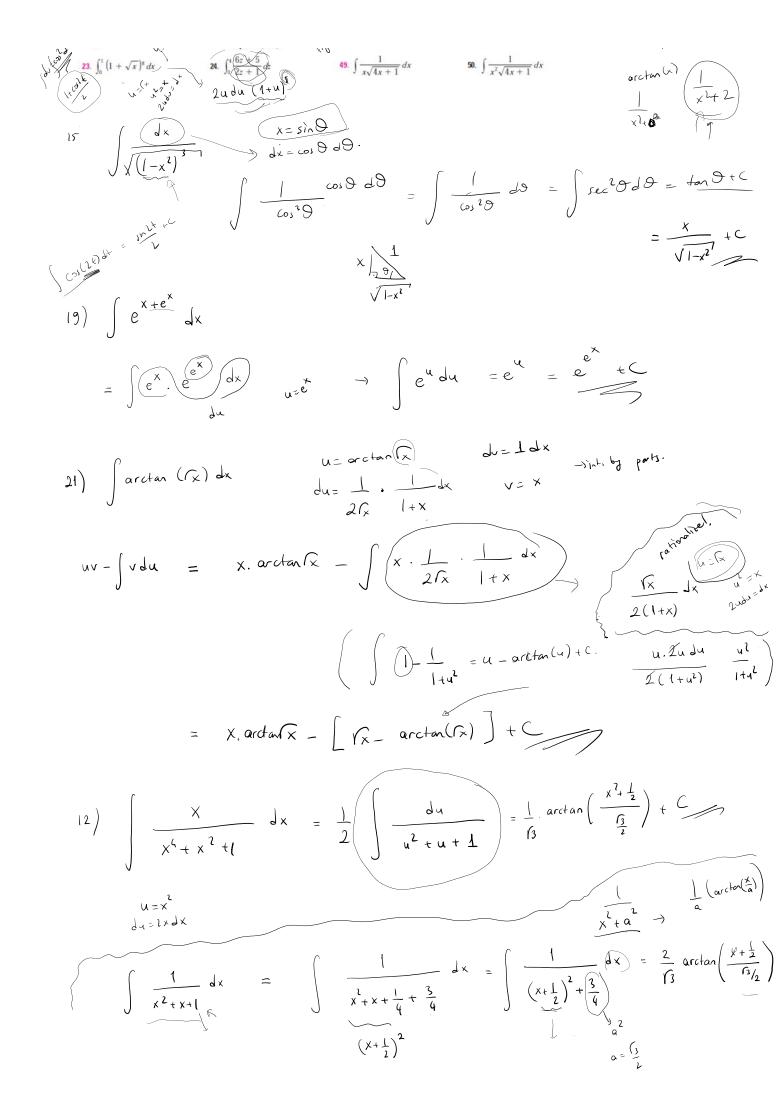
$$= \int \frac{-2}{u} du + \int \frac{2}{u^2} du + \int \frac{2}{u+1} du$$

$$\begin{array}{c} A+B=0 \\ B=2 \end{array} \Rightarrow A=-2$$

$$=-2\ln|u| - \frac{2}{u} + 2\ln|u+1| + C$$







$$\frac{\ln x}{dx^{2} + (\ln x)^{2}} = \frac{\ln x}{1 + (\ln x)^{2}} + C$$

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