Midton Review

Eggo Team in Simpson's Rule -> General Request

. Food Find expresi-

Approximate Skint+cost) dt by Simpson's Rule

for n=4 and find the error bound.

Solution: $S(4) = \frac{\Delta x}{3} \left[f(x_0) + 4 f(x_1) + 2 f(x_2) + 4 f(x_3) + 4 f(x_4) \right]$

 $\Delta_{x} = \frac{\pi - 0}{4} = \frac{\pi}{4}, \quad x_{0} = 0, \quad x_{1} = \frac{\pi}{4}, \quad x_{2} = \frac{3\pi}{4}, \\
 x_{4} = \pi.$

 $\frac{1}{3} \left[\frac{5 \ln (6) + \cos (0)}{3} + 4 \left(\frac{1}{3} + \frac{1}{4} + \cos \frac{11}{4} \right) + \cos \frac{11}{4} \right] + 4 \left(\frac{1}{3} + \frac{1}{4} + \cos \frac{11}{4} \right) + 4 \left(\frac{1}{3} + \frac{1}{4} + \cos \frac{11}{4} \right)$

 $(\pi)_{200} + (\pi)_{12}$; +

- TT [1 + 4 (\frac{1}{\tau_1} + \frac{1}{\tau_2}) + \text{Pet} 2 + 4 (\frac{1}{\tau_2} - \frac{1}{\tau_2}) \\
+ 0 \tau]

- II [2+4/2]

 $f(\theta) = (\sin \theta + \cos \theta)$; $f(4)(\theta) = \cos \theta - \sin \theta + \cos \theta$

Now 1 sin 11 < 1, 1 cos 01 < 1

Thus. | f(4)(0) | < 1+1=2 [K]

The error is bounded by $K(\pi)^{\frac{5}{2}} = \frac{2(\pi)^{\frac{5}{4}}}{(180)(4)4}$

1) d () (25 t 13 + t - 15) dt)

Suppose $\int 25t^{1} = 25$ $f(t) = 25t^{15} + t^{-15}$ and its antiderivative is F(t)

Then dry Fundamental Threorem of Calculus e^{x^2}) $\int (25t^{15}+t^{-15}) dt = F(e^{x^2}) - F(x^2)$

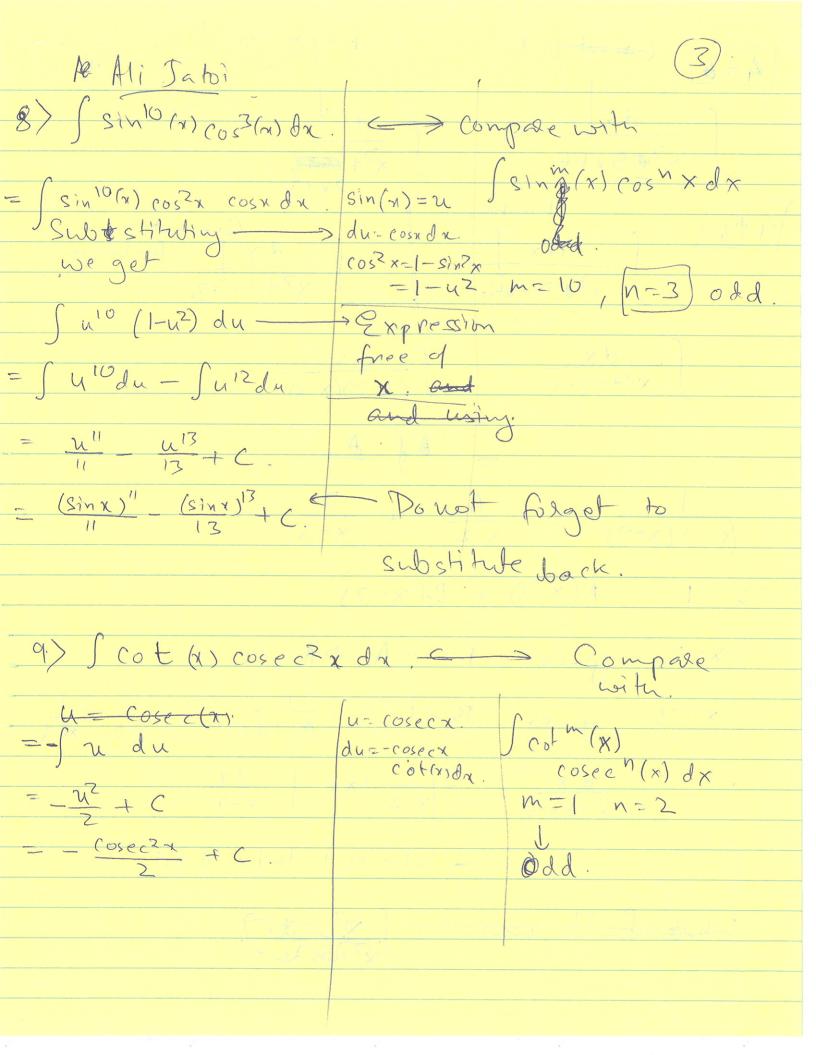
There of (25t15+t-15) dt)= F/(ex2) d(ex2)

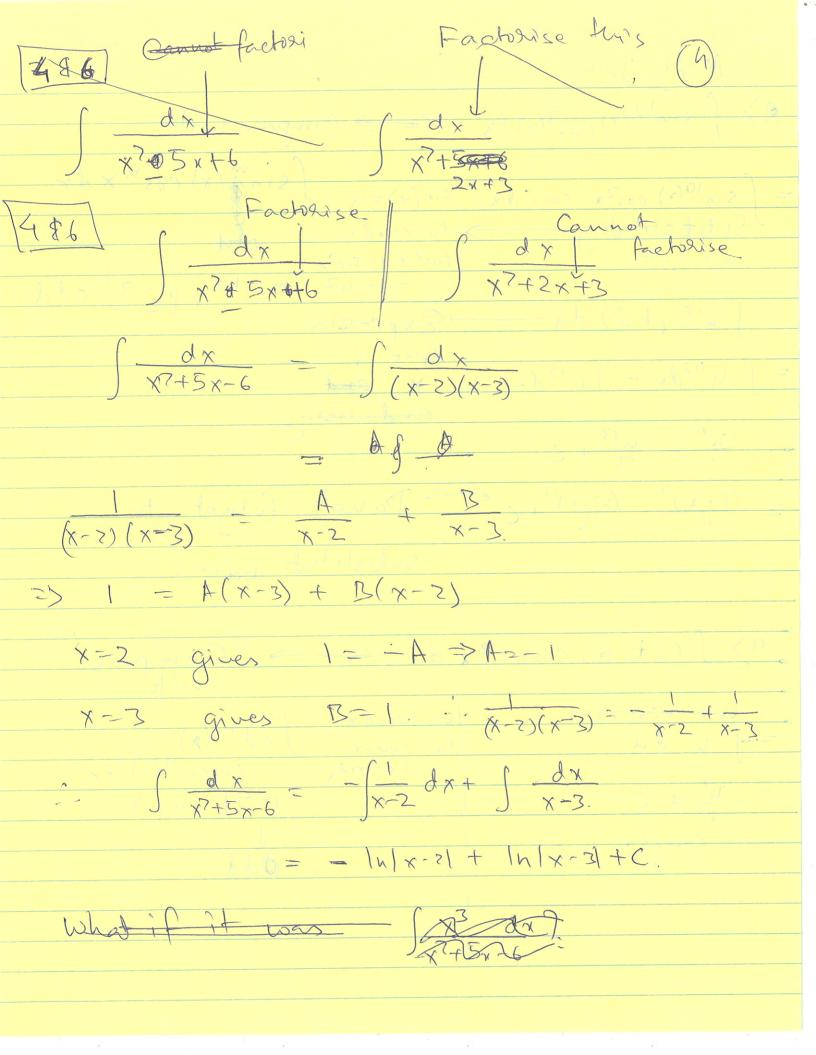
 $-F(x^2) d(x^2)$

 $= f(e^{x^2})(e^{x^2} 2x)$ $- f(x^2)(2x) [Fis]$ antider

 $= (25(e^{x^2})^{15} + (e^{x^2})^{-15})(e^{x^2}2x)$

 $-\left(25(\chi^{2})^{15}+(\chi^{2})^{-15}\right)(2\chi)$







$$\int \frac{dx}{x^{2}+2x+3} = \int \frac{dx}{x^{2}+2\cdot 1x\cdot +1^{2}+3\cdot 1^{2}}$$

$$= \int \frac{dx}{(x+1)^{2}+2\cdot x+1^{2}+3\cdot 1^{2}}$$

$$= \int \frac{dx}{(x+1)^{2}+3\cdot x+1^{2}+3\cdot 1^{2}}$$

$$= \int$$

Solve. et 2/1-ty withy with y (0)=1. ety - ty -> Y => etdy = ty => # dy=fte-talt -> Separted yandt and integrated => Inly = fte-t'dt - t2= u Substituting - we get, => tdt=_du Inly = - eudy = - = Seudu = - = e + C $|y| = e^{(-\frac{1}{2}e^{-t^2} + c)} = e^{(-\frac{1}{2}e^{-t^2})} e^{c}$ $|y| = \frac{1}{2}e^{-\frac{1}{2}}e^{$: \(\frac{4(0)}{10} = \frac{1}{2} e^{-\frac{1}{2}} e^{-\