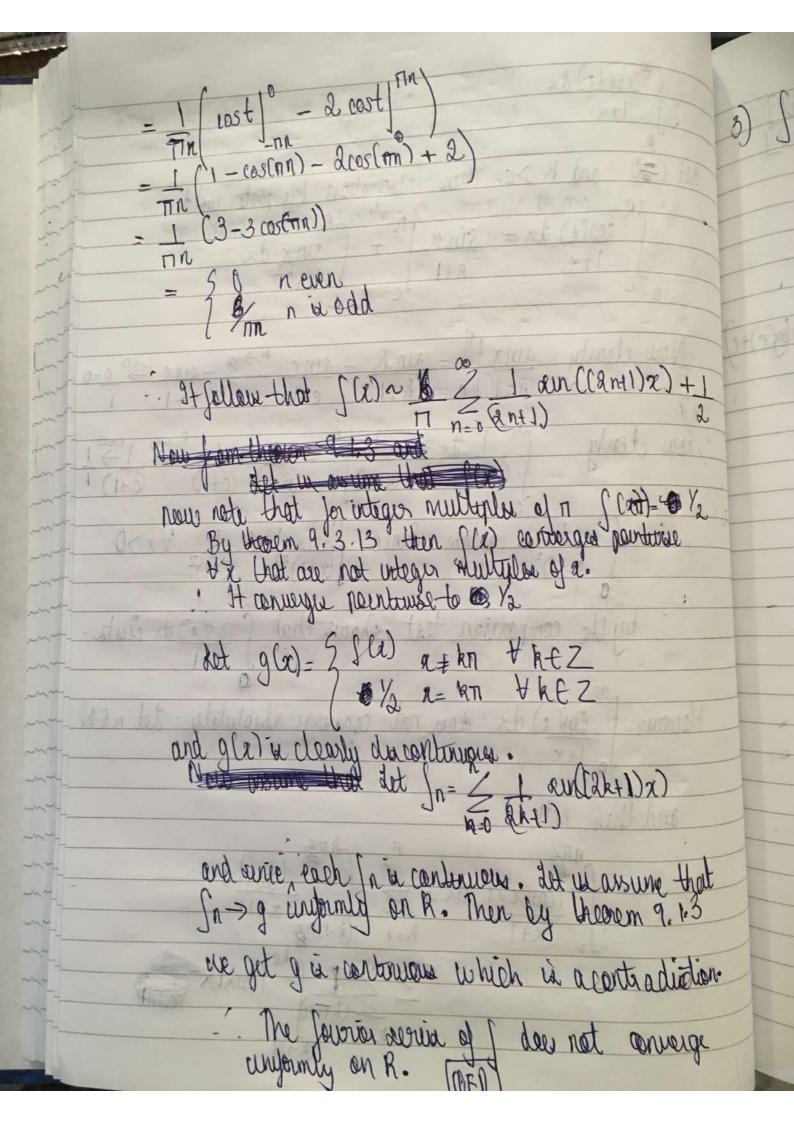
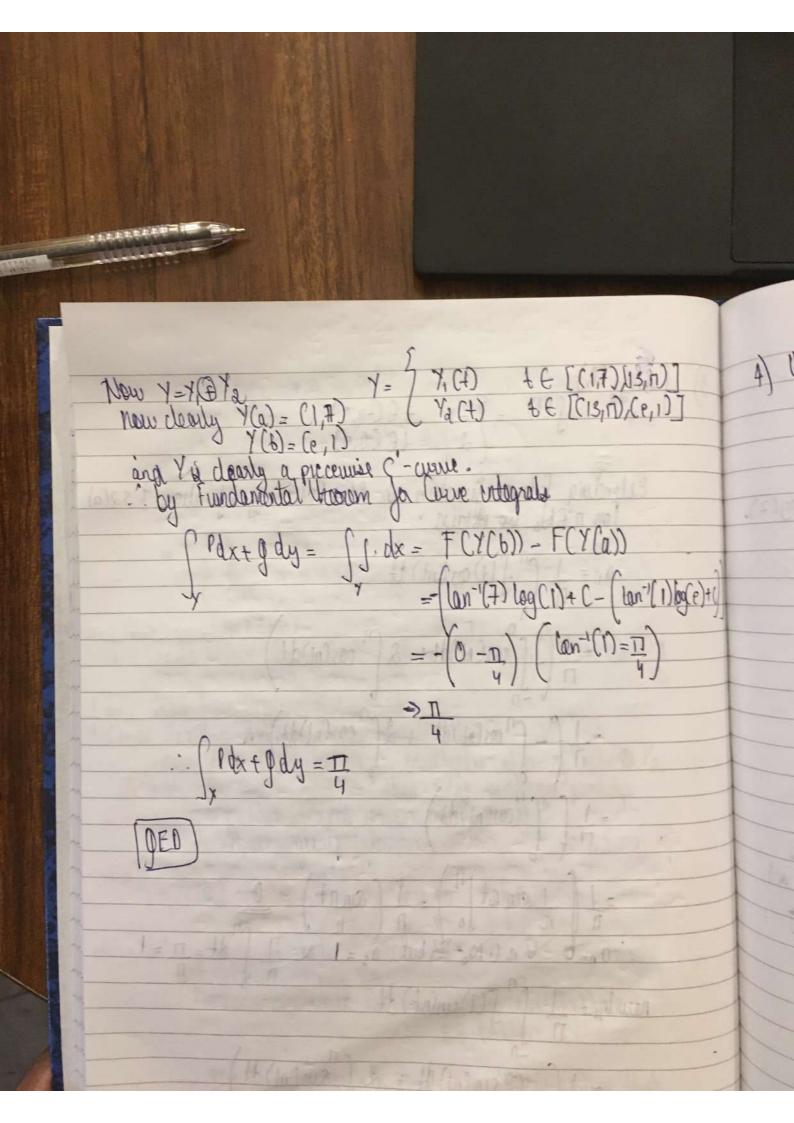


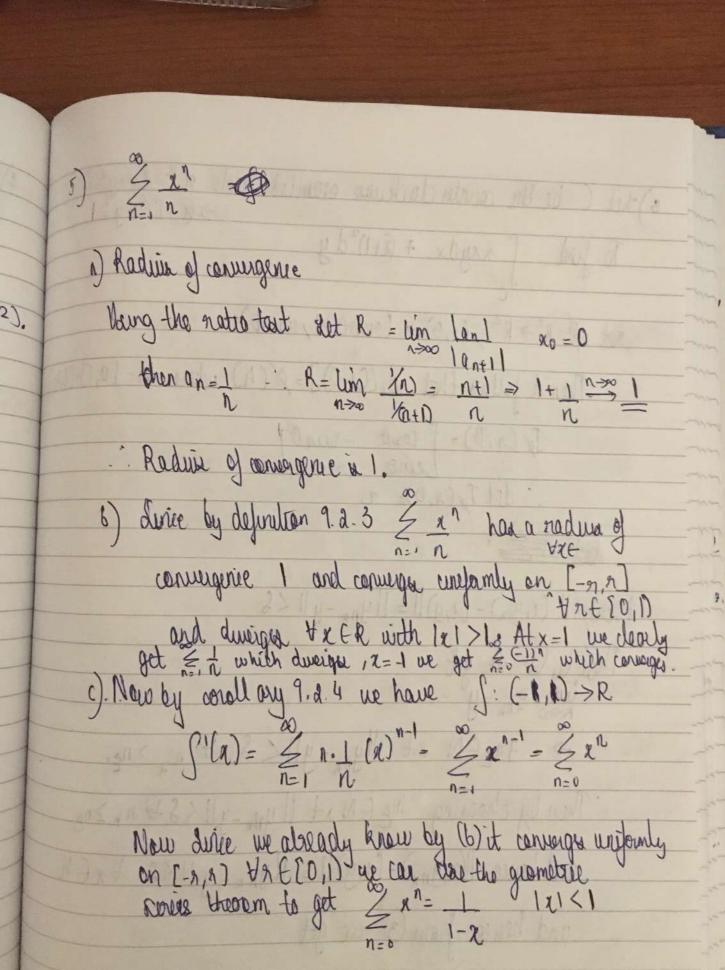
Extending f to a function in P Can (2) using definition 9 sa(a) an= 1 (" set) oos ent) lt  $= \frac{1}{\Pi} \left( \int \cos(nt) dt + 2 \int \cos(nt) dt \right)$  $=\frac{1}{17}\left(-\int_{0}^{1}\cos(nt)dt+d\int_{0}^{1}\cos(nt)dt\right)$  $=\frac{1}{17}\left( \cos(nt)dt\right)$  $= \int_{\Omega} \int_{\Omega} \operatorname{dun} ut \int_{\Omega} -\int_{\Omega} \left( \operatorname{sun} \eta t \right) = 0$   $= \int_{\Omega} \int_{\Omega} \operatorname{dun} ut \int_{\Omega} -\int_{\Omega} -\int_{\Omega} \operatorname{dun} ut \int_{\Omega} -\int_{\Omega} -\int_{$ new bn= 1 ( ) S(t)aun(nt) dt = 1 (- Councry) dt + 2 (sin (nt) dt) = 1 (-1 fo den (t) dt + 2 forden (nt) dt)



4 U:=36,9 (R2: x>03 S=CP,9):U>R2 P(z,y) = lan-'(y) g(z,y) = log x +(x,y) & U  $Y = Y_1 \oplus Y_2 = \Gamma(1,7), (13,11) = Y_2 = \Gamma(13,11), (e,1)$ Paxtody ) 60(e)+1 Fruit to find by proposition 6.2. Il we have a consorvative vector Now to find the palantial function det F: R=> R be a polantial function for j.

Then FCP 1y) = [ lan-(y) dx =  $lan^{-1}(y) \int \underline{1} dx = lan^{-1}(y) log(a)$ New  $26 = 1 \log(9) - (\log x) = 0$   $3y \log^2 1 \log^2 1 \log x$ F(xcy)= lon-'(y) log(x) + C





 $\int_{-\infty}^{\infty} \int_{-\infty}^{\infty} (x) = \frac{1}{1-x}$ 

Then 
$$\int f'(x)dx = \int \frac{1}{1-x} dx$$

$$= -\ln(|x-1|) + C$$

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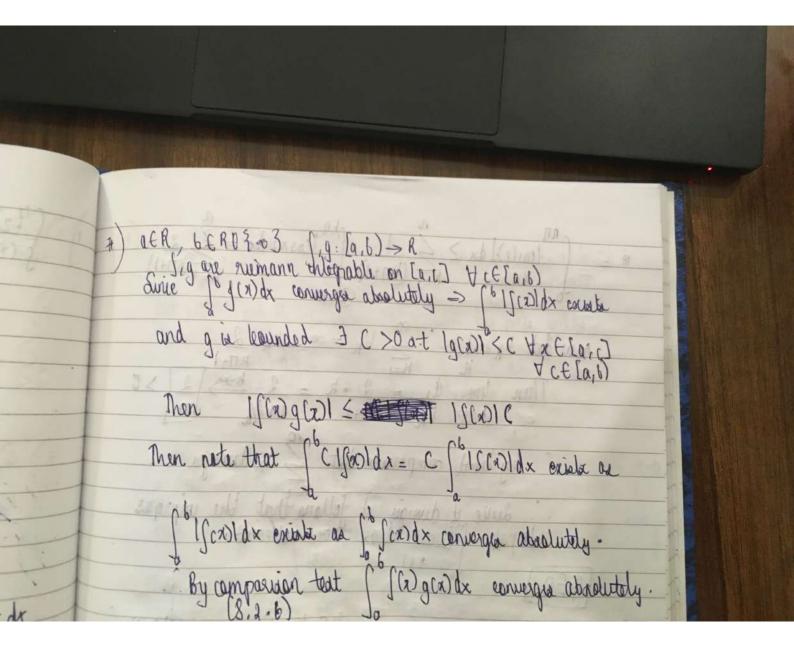
$$\frac{1}{1-x} = -\ln(|x-1|) + C$$

$$\frac{1}{1-x} = -\ln(|x-1|) = -\ln(|x$$

6) 6 be the counter clochiuse oriented circle x2-2x4y2=0 => &-1)2+y2=1 xdx dxydx + Cxtl dy Now  $(z-1)^2 + y^2 = 1$  is clearly a normally domain. Let 0 be this energian enclosed in C. Then by green theorem we get  $\int dxy dx + (x+1)^2 dy = \iint \left(\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y}\right) dA$  $= \iint (\lambda (x+1)) - \lambda x dA$ = d. T1912 (n=1) [from Note] =217 > area of circle 2xydx + (xtl)2dy = aTI Note | dA = By polar coordinate conversion we get

2n | 2n | 2n | 2n | de

2n | OED



and lan (11) to defined on all reR. suntenerample:

Aut J= our then by example I in thosem 8.2.6: Jours dr Courter example: we know it converged but not absolutely considered.

Let g = ninx which is dearly bounded by I above Then | g(x)dx Now set is then found dx = - cosx = cos 1- cos c/0 which could.

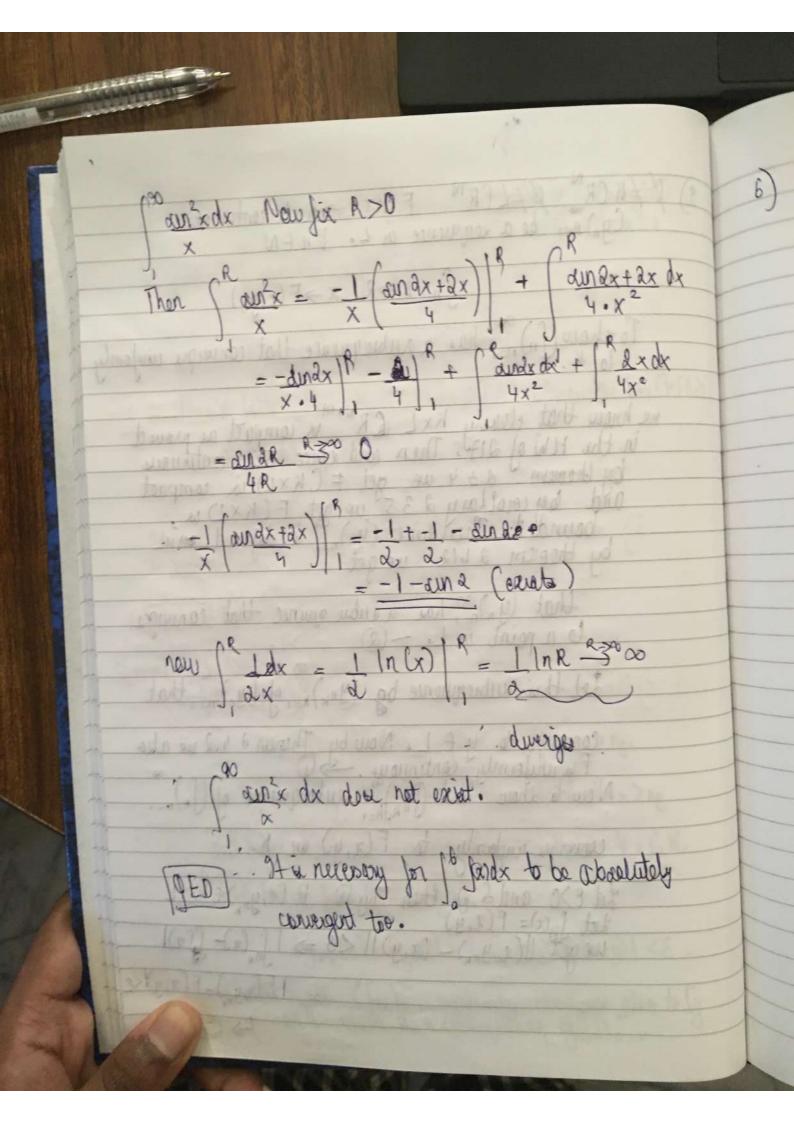
Both Jand gave also ruemann integrable on [a,c] of CE[a,b]

Now to glad = Jan & dx

Jeth Jand gave also ruemann integrable on [a,c] of CE[a,b]

and [1,c] is

a closed interval so ruemens integrable,



s) \$\fix L \rightarrow R \text{ continuous } \( \text{Cyn} \) \tilde{n} = 1 \text{ be a sequence in L. Yn FN} In: K > R x > F (a, yn) To show (In) no has a rubsequence that converges windowly Je[0,30] we know that clearly  $K \times L$   $CR^{N+m}$  is compact as proved in the HW of AIX. Then and since F is continuous by theorem A.3.4 we get  $F(K \times L)$  is compact and lay corollary A.3.5 we get  $F(K \times L)$  is compact be bounded. Then since  $(y_n)_n$ , is defined wink by theorem A.1.12 we get that  $(y_n)_n$ , has a subsequence that converges to a point in L.  $- \otimes$ Let this aubsequence by  $(y_{n_k})_{k=1}$  of  $(y_n)_{n=1}$  that Converged to y & L. Now by Theorem & 4.2 we also Fix uniformly continuous. In all subsequence of (In) n=. converge uniformly to F(x,y) on K. Let  $\xi>0$  and  $\xi>0$  then by  $\emptyset$   $\forall$   $(\alpha,y_n) \in K \times L$  Let  $f_{\mu}(\alpha) = F(\alpha,y)$  we get  $||(\alpha,y_n) - (\alpha,y)|| < 8 \Rightarrow ||f_{\mu}(\alpha) - f_{\mu}(\alpha)||$ =  $1F(x,y_n)-F(x,y)<\varepsilon$ 

