

 $G_1 = \{ 1, -1, i, -i \}$   $G_1 = \{ P_1, P_2, P_3, P_4 \}$   $\Phi: G_1 \rightarrow G_1$ d (a) = Pa Proof! let G be the Given Group and A(GI) be the Group of all
permutation of the set G.

for any affine a map

fa: GI -> GI ->

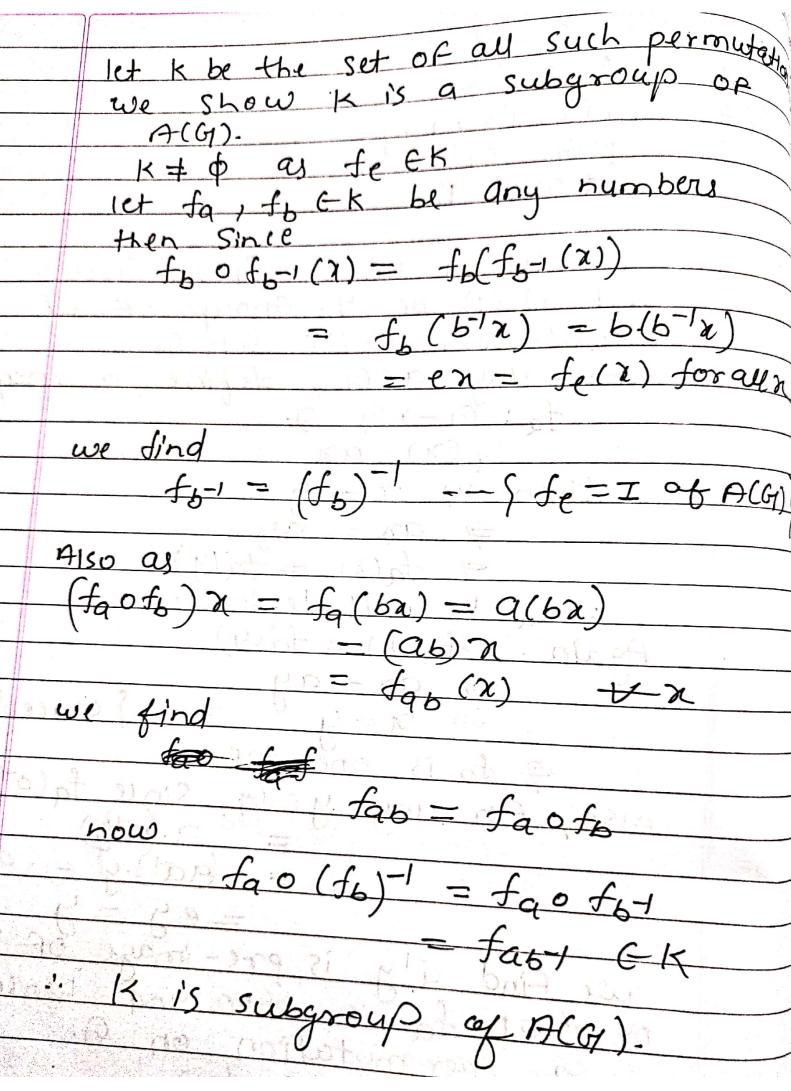
fa(x) = ax then ay x = y  $\Rightarrow ax = ay$  = fa(x) = fa(y)= fa is well defined.

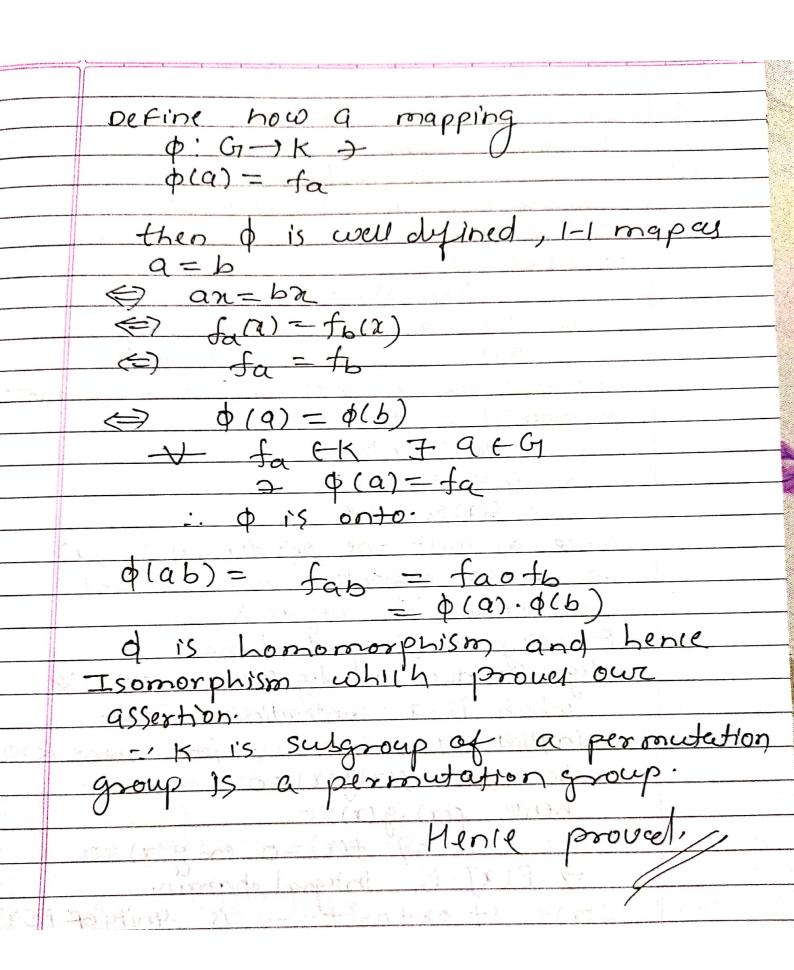
Again, facri) = facy) Tigalin, significant =  $\frac{1}{2}$  and =  $\frac{1}{$ = ey = y

we find a y is pre-image of y

or that fa is onto and hence

a per mutation on G. thus fa EA(G1).





03!-	If F is a Field, then FCX] is a
	Fuclidean domain.
51 <b>0</b> .	TICETOLD 7
	suppose F is an integral domain
1	suppose F is an integral domain let fix), giri be any two non zero member
	OF FIRJ. 7
	$f(x) \cdot g(x) = 0$
	where f(11) = 90+ 9,7+ + 9m2
	g(x) = bo + b1x+ + bn2
Comments of the Comments of th	now both fix) and g(x) can not be constant
	polynomial as then
- 1	90 \$0 , bo \$0
	$S_{0} = q_{0} \cdot b_{0} \neq 0$
The second of	$= f(x)g(x) \neq 0$
	Since at least one of fire and gir
	can not be constant is non constant
	polynomial it's degree is >1
	F being an integral domain
	which is a controllering
	(01)11 401(7101) as it
. 1	some Kyo
	hense consequence
	USYS ALL STORY
	$\Rightarrow$ F(x) =0 or $g(x) = 0$
	7(2)= 14 0 1 2 1
	FERT is an integral domain with unite.
	Tor any fix) FECT
ar a	define 1 +(x) +0
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d(f(7)) = degf(x) which is non-neg Integr Since For any f(x), g(x)  $\in F(x)$ ,  $f(x) \neq 0$ ,  $g(x)\neq 0$ deg (fr) g(x)) = deg f(x) + deg g(x) we get  $deg(f(x)) \leq deg(f(x), g(x))$   $d(f(x)) \leq d(f(x)g(x))$ in FEXJ, 7 g(x) and r(x) in FEXJ >  $f(x) = \phi(x)g(x) + \pi(x)$ where  $e(H) = \pi(x) = 0$  or  $deg_{\sigma(x)} < deg_{\sigma(x)}$ IF deg f(x) < deg g(x)

then f(x) = 0.g(x) + f(x) gives the result.

Assume now the result is true For all

(non zero) polynomials in FCXJ of deg less

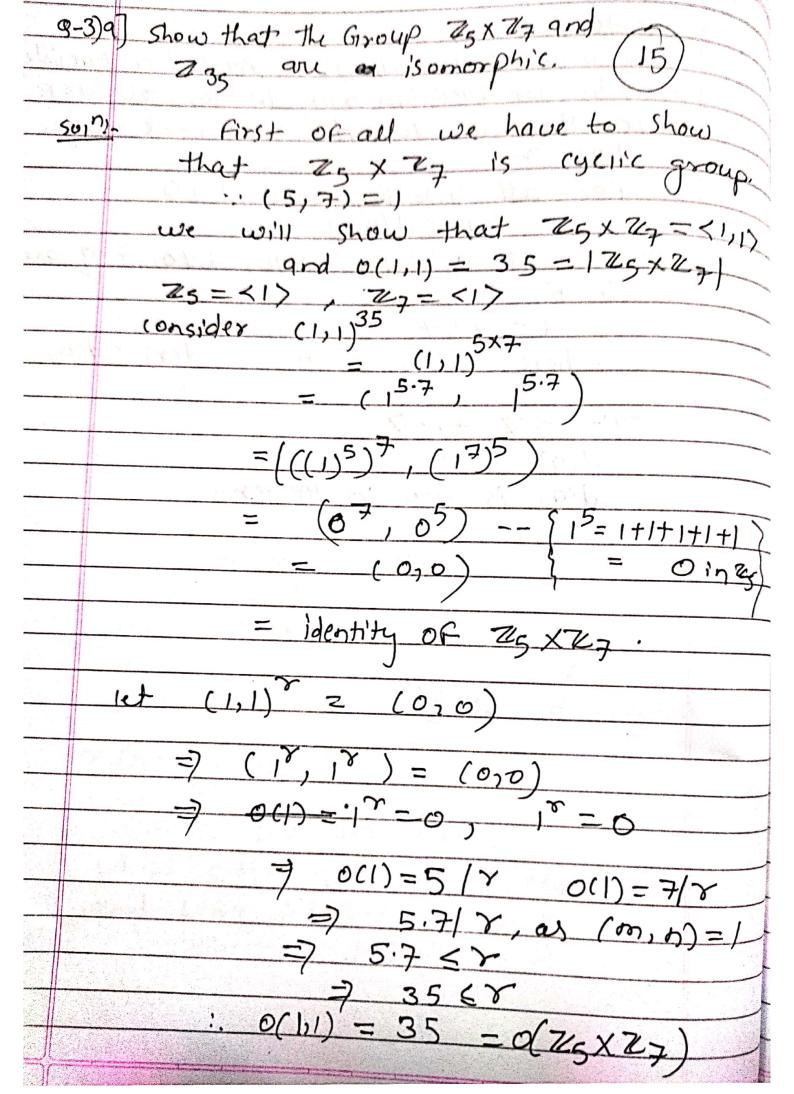
Here dec ((x)): then degf(x).

Let  $f(x) = 90 + 912 + 921^2 + --- + 9m x$ g(x) = bofbin + - = tbnan suppose deg f(x) > deg f(x)the  $oefine f(x) = f(x) - ambn'a^m f(x)$ 

```
then coefficient of no in fin) is
    9m - 9m bn bn = 9m = 9m = 0
   they either fi(x)=0 (zero polynomial)
       or degfind < m
     IF fix)=0 thin
    0 = f(x) - a_m b_n^{-1} n^{m-n} g(x)

give f(x) = a_m b_n^{-1} n^{m-n} g(x) + 0
     So by taking
g(x) = a_m b_n a_{n-h}
and \pi(x) = 0
       we get required regult.
   Suppose - f1(21) # 0
     then deg fin <m
   i.e. deg fi(x) < deg f(x)
    by in 84ction hypothesis
      f(x) = f(x) f(x) + \gamma(x)
   where either sar=0 or deg sar) < deggor
  · f(x) - ambo 2 2 m-n g(x) = 4,(x).g(x) + 80x)
or fr)= [9mbn-12m-n+q1(x)] gox) + oral)
        2(x).g(x) +2(x)
 where either son) so or deg d(x) < deggo)
 and hence FERT is a
    Eucildean domain.
```

Fucidean domain's
In integral domain R is called a Eucliden
domain or Euclidean ring it for all ack
ato there is defined a non-ve integer
$d(q) \rightarrow$
(i) for all a, b = R, a + 0, b + 0
$d(q) \leq d(q_1b)$
ii) For all a, bf R, a to, b to, f q godr
in R 7
q = +b+7
where either r=0 or d(r) < d(b).
eg!- <z 1+,.=""></z>
d(9) =  9
d(9) is non-ve integer
I the state of the
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henle 76 x 7/7 = 2011) 7 we know any two cyclic group of order or is always isomorphic to Zn. Given by mapping, φ! 25×27 -> 7-35 φ[(1)1) -> ~ φ: 235 -> \$ 25 x Z<sub>7</sub> φ(γ) = (1,1)<sup>γ</sup> 1et r = s(1) r = (1)(2)  $\phi(r) = \phi(s)$ .  $\frac{1}{(x,y)} = \frac{25 \times 27}{(1,1)}$ : + (x,y) + Z5x77 Jr EZ37 2 f(r) - (1,1)~ \$ (x+5) = (1,1) x+5  $= ((11)^{\gamma}, (1)1)^{S}$  $= \phi(r) \cdot \phi(s).$   $: \phi is homomorphism.$   $: \phi is isomorphism.$