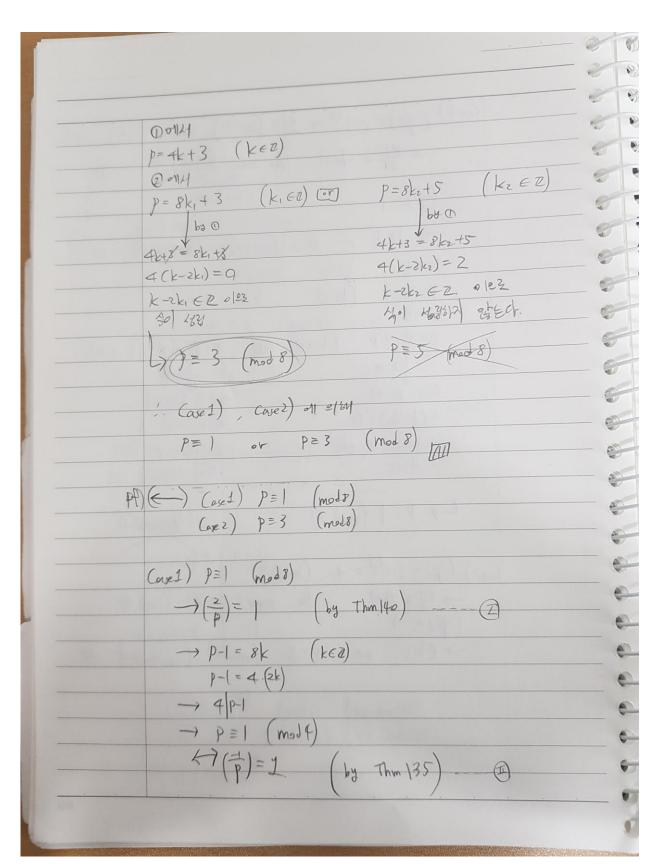
	2
(0) (0) (0) (1)	2
$Q7 \qquad (a) \qquad \alpha = 2kH \qquad (k \in \mathbb{Z})$ $\alpha^2 = 4k^2 + 4kH$	8
02-1 = 4K2+4K	8
=4k(kt)	-
(k)+ 22/9 -> 8 4k(k+1)	8
L k7+ 24 → 8/4 (kt/)	6
:. 8 42(KH) (KEZ)	
$\rightarrow 8 \mid \alpha^2 - l$	0
$\rightarrow a^2 \equiv \pmod{8}$	0
(6) 性 多 公	
(2)=1 () P=1 or 3 (mod 8)	
	- 6
A) (\rightarrow) $($	-
= 1	-
740.1 (1	
759el 45	
$\left(\frac{-1}{p}\right)\left(\frac{2}{p}\right)$	
	-
(ase2) -1 -1	•
(1) (.8)	e
$(-p) = (-1)^{-2}$ (mod P) (by Cor 133)	e
$(\frac{-1}{p}) = (-1)^{\frac{p+1}{2}}$ (mod P) (by Cor 133) $(\frac{-1}{p})$, $(-1)^{\frac{p+1}{2}} \in \{\pm, \pm\}$ (by Lemma 34)	6
$\Rightarrow \left(\frac{1}{p}\right) = \left(\frac{1}{p}\right)^{\frac{p-1}{2}}$	6

Case 1) $\left(\frac{1}{p}\right) = \left(\frac{1}{p}\right)^{\frac{p}{2}} = \frac{1}{p} \left(\frac{1}{p}\right)^{\frac{p}{2}}$
(a)e+) (P)= (+) = -
$\Rightarrow \frac{1}{2} = 2k \text{(As some } k \in \mathbb{Z}) = 0.$
$\left(\frac{2}{\Delta}\right) = 1$
→ P= 1 or P=7 (mod 8) (-by Thm 140) ()
0014
P=4kt (keZ)
@ 914
p=8k1+1 (k162) ET p=8k2+7 (k262)
pa p
4LV=8L+17
$4(k-2k_1)=0$ $4(1c-2k_2)=6$
k-2k, ∈ Z 0/02 k-2k2 ∈ Z 0/22
40/ HB स्टिश्नर रहेट
D= 1 (mod 8) P= 2 (mod 8)
(ae^2) $\left(\frac{-1}{p}\right) = \left(-1\right)^{\frac{p}{2}} = -1$ (beA)
$\rightarrow \frac{g-1}{2} = 2k+1$ for some $k \in \mathbb{Z}$. $\rightarrow 0$
$\left(\frac{2}{\rho}\right) = -1$
→ P=3 or P=5 (mod 8) (by Thin 140) - @
140
The second second second second



3	(D+(D 01) =124)
	$\left(\frac{-2}{p}\right) = \left(\frac{-1}{p}\right)\left(\frac{2}{p}\right) = 1$
	21
	(ase2) P=3 (mod 8)
	$\rightarrow \left(\frac{2}{p}\right) = -1$
	$\left(\frac{-1}{p}\right) = \left(-1\right)^{\frac{p-1}{2}} \left(by \ \ A\right)$
	$p-3=8k (k\in\mathbb{Z})$ $p-1=8k+2$
	P-1=8k+2
	P-1 =4k+1
	$\frac{1}{P} = (-1)^{Act} = (-1)^{Act}$
	- (1) + (1) or 1 star
	$(\frac{2}{p}) = (\frac{1}{p})(\frac{2}{p}) = (1)(1) = 1$
	-(

