Assignment 3

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Problem 1 (2.14)

Compute the Values  $e_1, e_2, e_3$  in the proof of Theorem 2.6 in the case where k=3,  $n_1=3$ ,  $n_2=5$ , and  $n_3=7$ . Also, find an integer a such that  $a=1 \pmod{3}$ ,  $a=-1 \pmod{5}$ , and  $a=5 \pmod{7}$ .

i) a= 1 (mod3) + e1 Lets say Answers of i) ~ iii) A, A2, A3

ii) a = -1 (mod 5) → l2 50 a= A1+A2+A3 (mod 3×5×7)

Similarly 5x Az, and 7x Az

60. N = 5×7×€1+3×1×€2+3×5×€3 (mod 3×5×17)

=>  $\chi = \int \chi = 35e_1 + 21e_2 + 15e_3 \pmod{3} = 35e_1 + 0 + 0 \pmod{3} = k_1$   $\chi = 25e_1 + 21e_2 + 15e_3 \pmod{5} = 0 + 21e_2 + 0 \pmod{5} = k_2$  $\chi = 35e_1 + 21e_2 + 15e_3 \pmod{5} = 0 + 0 + 15e_3 \pmod{5} = k_2$ 

use modular inverse

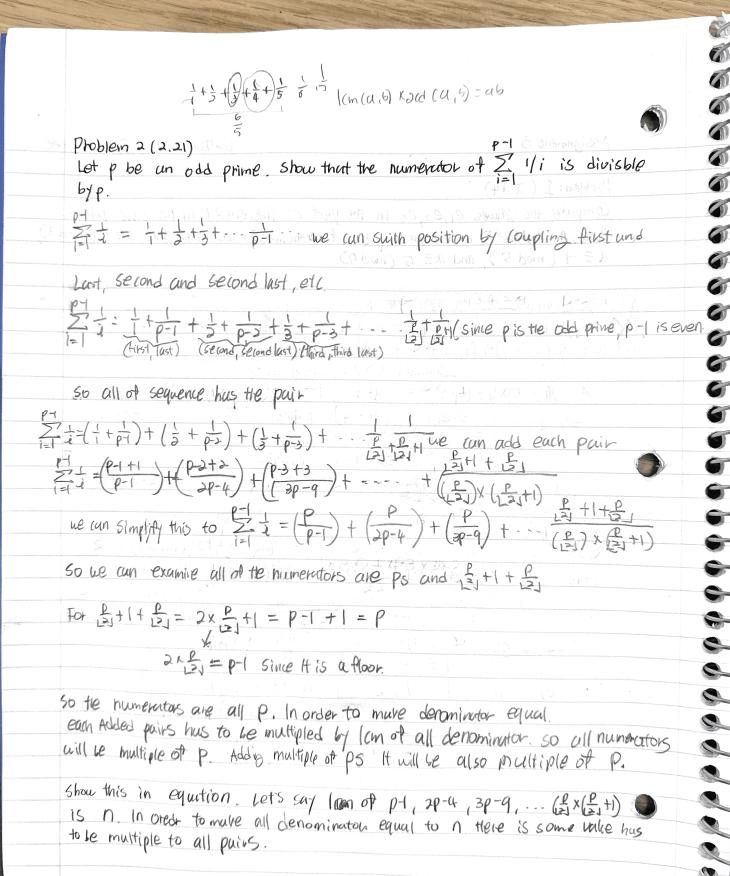
11 2-1

1(mod3) = 35 x (35 - x 1) (mod3), 35 - (mod3) = 2 - (mod5) = 21 x (21 - x - 1) (mod5), 21 (mod5) => 1 (mod5) => 1 - (mod 1) = 15 x (15 - x 5) (mod 1), 15 - (mod 1) => 1 - (mod 1) => 1

 $e_1 = 35 \times (2) = 70$   $e_2 = 21 \times (1) = 21$   $e_3 = 16 \times (1) = 15$  a = 70 - 21 + 75 = 124

124 (mod 105) = 19 mod (105)

a=124 e1=70, e2=-21 e3=75



$$\frac{P \times \overline{P+1}}{P + X \cdot \overline{P+1}} + \frac{P \times 3\overline{P-q}}{2P - q \times 3\overline{P-q}} + \cdots + \frac{P \times (\frac{P}{2})(\frac{P}{23} + 1)}{(\frac{P}{23})(\frac{P}{23} + 1)} \times \frac{1}{(\frac{P}{23})(\frac{P}{23} + 1)}$$
The numerators are all mattiple of  $P$  so the sum up will be divided by  $P$ .