MTH26001- Elementary Number Theory. Name: Nguyen Minh Duc Student ID: 20202026

Quiz 3.

Problem 1.

& Since 50 = 2x52, 50 has a primitive root.

Q Q 4 4(5)= 40 (50)= 20 ((2) ((5)) = 1 × 20 = 20.

31 = 1 (mod 50). 32 = 9 (med 50)

3 = 9x3 = 81 = 31 (mod (6) 59 1 1 = (=)

3 = 34,31=31,3=93=43 (mod 50)

310 = 35x35=43x43 = 1849 =49 (med 50)

320 = 310 x 310 = 49 x 49 = 2401 = 1 (mod 50)

=> 3 is a primitive root of 50.

Q. Since grd(3,50) = 1, 33 = 27 (mod 50) a is also a primitive root of 50.

@ Thus, Two primitive roct of SO is 3 and 27.

Problem 2.

Q For p=3, 7=7=7=1 (mod 3) 27 7 is a quadratic root residue of 3 $= 27 \left(\frac{2}{3}\right) = 1.$

0 For P=5, 7 = 7 = 49 = 4=-1 (mod 5) 2) 5 is not a quadratic residue of 5) => (=)=-1.

For
$$p > 7$$
, $\left(\frac{7}{p}\right) = \left(\frac{p}{7}\right)$

$$= P^{3} \pmod{7}$$

$$P^{\text{mod } 7} \mid 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7$$

$$P^{\text{mod } 7} \mid 0 \mid 1 \mid 1 \mid -1 \mid 1 \mid 1$$

Since any odd primeris of the form 7 K+3 or 7 K+5,

P³ = -1 (mod 7).

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$$\frac{1}{2}, \frac{1}{2}, \frac$$

(0? 60m) 1: 1043 = 64.64 = 0,2 = 6.5 = 0,3 = 0.5

a. Since gide 8,501 = 1, 3 = 27 cmod 50) are also a primitive voice

I Thus, Two primitive root of so is 3 and 27.

(8 bow) F = 7 = 7 (8 -4 11 8

of its a produced rock regularly s

 $A = \left(\frac{T}{2}\right) \approx 1$.

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