CM 1606 Computational Mathematics

Tutorial No 06

Part A

1) Simplify the following logarithm expressions.

$i)\log_3 243$

$ii)\log_2 4^{10}$

$iii)\log_3 9^{99}$

$iv)5^{\log_5 125}$

$v)3^{\log_4 64}$

2) Find the simplest form of the expressions given.

$i)\log_{10} 54+\log_{10} 5-3\log_{10} 3$

$ii)5\log_2 6-(\log_2 4+\log_2 243)$

$iii)3\log_2 4+\log_{10} 0.001$

3) Simplify for x by applying rules of logarithm.

$i)\log_{10}(\log_{10}(\log_{10} x))=1$

$ii)\ln(2x-3)+\ln(x+5)=\ln(2x^2+6)$

$iii)8+3\log_2 x=2$

$iv)\log_3(6x-7)-\log_3(x^2-x-37)=0$

4) If $\log_{10} 5=0.6990$,determine $\log_{10}\left(\dfrac{500}{(0.025)(1.25)^3}\right)$.

Part B

1. Answer the following questions.
   i. 48 mod 5
   ii. 32 mod 6
   iii. 128 mod 7
   iv. 85 mod 3
   v. 188 mod 9
2. Identify two different numbers that fit in the blank of each situation given below.
   i. 67 ≡1 (mod ……)

ii. $83 \equiv 3 \pmod{\ldots\ldots}$

3. Solve for y.

   i. a mod 11=9 and
      (131+a) mod 11=y

   ii. a mod 7=4
      (a-29) mod 7=y

Part C

Use modular arithmetic to solve the following problems.

1) I had 47 oranges that I divided evenly among 5 friends. I ate the leftover oranges. How many oranges did I eat?
2) I dealt all the cards of a regular deck of 52 cards among Anne, Thilina, Nishan and myself for a game. Were the cards dealt evenly?
3) A researcher conducted a research on online teaching techniques and after collecting data, he starts the data analysis part today (Monday) and planning to lasts for 47 days. On what day will it end?
4) A researcher collected some information about Covid- 19 infected patients 17 days ago. If Tuesdays are the only day of the week that he goes to collect data for any research he conducts, then what day of the week is today?
5) One of the seven students Fenaz, Nisal, Dilan, Chethana, Kirthika, Fathima and Sandun achieved 100 marks for the final examination. Consider the situation when they sit in a raw according to the same order mentioned above. If you start counting from Fenaz and wind back and forth while counting (Fenaz, Nisal, Dilan, Chethana, Kirthika, Fathima, Sandun, Fathima, Kirthika, Chethana, …….), then the student who achieved total of 100 marks would be the 1000^{th} student that you count. Determine the student who got 100 mark for the final examination.