Section 1 Lecture 3 – Modular Arithmetic - Exercises

Q1) What are the following?

(i) 5 (mod 3)

(ii) 43 (mod 5)

(iii) 17 (mod 2)

(iv) 18 (mod 6)

(v) 101 (mod 10)

(vi) 60 (mod 7)

(vii) 4 (mod 5)

(viii) 3 (mod 3)

(ix) 0 (mod 8)

Q2) What letters are the following equivalent to?

(i) 17 (mod 26)

(ii) 29 (mod 26)

(iii) 52 (mod 26)

(iv) 61 (mod 26)

Q3) *(Additional - some questions for you to think about if you are interested!)*

(i) *What would x (mod 1) be for any integer x?*

(ii) *What would n (mod n) be for any positive integer n?*

(iii) *Can you define x (mod 0)?*

(iv) *Research and list as many uses of modular arithmetic as you can find. Can you find a use in a field you are interested in (for example, if you are interested in music, find a use in music)?*

(v) *Consider the set of integers (mod 5), which is 0, 1, 2, 3, 4. Each of these apart from 0 has an "inverse" – that is you can multiply it by another number in the set to get 1 (mod 5). For example, the inverse of 2 is 3, since 2 x 3 = 6 = 1 (mod 5). Check it works for all the numbers (apart from 0). Under what circumstances will this work in general for (mod n)?*