MA2C03: TUTORIAL 2 PROBLEM SHEET

1) Prove that $A \setminus (B \setminus C) = (A \setminus B) \cup (A \cap C)$ for all sets A, B, and C.

2) Let A be the set of all people who have ever lived. For $x, y \in A$, xRy if and only if x and y were born less than one week apart. Determine:

(i) Whether or not the relation R is *reflexive*;
(ii) Whether or not the relation R is *symmetric*;
(iii) Whether or not the relation R is *transitive*;
(iv) Whether or not the relation R is an *equivalence relation*;

Justify your answers.

3) (From the 2016-2017 Annual Exam) Let Q denote the relation on the set $\mathbb{Z}$ of integers, where integers x and y satisfy xQy if and only if

$$x - y = (x - y)(x + 2y).$$

Determine the following:

(i) Whether or not the relation R is *reflexive*;
(ii) Whether or not the relation R is *symmetric*;
(iii) Whether or not the relation R is *transitive*;
(iv) Whether or not the relation R is an *equivalence relation*;

Justify your answers.

Solutions will be discussed in the tutorial next week.