Onlin Quiz 7

Q1 (i) From the definition of addition of rationals, gives.

$$(a,b) \oplus (c,b) = (a+c, b).$$

Since (d,c) is the additive inverse of (b,a), gives.

$$\frac{b}{a} + \frac{d}{c} = 0 \Rightarrow \frac{d}{c} = -\frac{b}{a}, \text{ gives.}$$

Thus we have $(d,c) = -\frac{b}{a}$

(ii) From page 4, we've found the solution to $ax=b$ is denoted by (b,a).

Since from (i), we obtain that $(d,c) = -\frac{b}{a}$ and $(-b,a) = -\frac{b}{a}$ from the definition, gives $(d,c) = (ax=-b)$

$\Rightarrow (d,c): ax=-b$. which is the second representation

Q2: From page 7 of the slides, we obtain that $(a,b) \leq (c,b)$ if and only if $a \leq c$.

Assume $(b,a) \leq (n,m)$. from Q2b, gives, $a \geq m$

Thus we obtain that $(mb, ma) \leq (an, ma)$, which from the definition gives.

$mb \leq an$ as the second entry the same.

Since $m, b, a, n \in \mathbb{Z}$, according to the property of inequality gives $-mb \geq -an$

From Q1, gives. $\sim(mb, ma) = (-mb, ma)$. and $\sim(an, ma) = (-an, ma)$.

Since $ma = ma$. $-mb \geq -an$, gives. $(-an, ma) \leq (-mb, ma)$. which.

$\Rightarrow \sim(an, ma) \leq \sim(mb, ma)$.

Since $a \geq m$, gives. $\sim(n,m) \leq \sim(b,a)$ as needed.