Class 11 Solutions Chapter 2 Relations Ex 2.3 Q20

We have,

$$R = \{(a, b) : a, b \in Z, a - b \text{ is an integer}\}$$

Clearly, Domain $(R) = z$,

Range $(R) = z$.

Class 11 Solutions Chapter 2 Relations Ex 2.3 Q21

Let $\left(1, \dfrac{-1}{2}\right) \in R_1$ and $\left(\dfrac{-1}{2}, -4\right) \in R_1$

$\Rightarrow$ $1 + 1 \times \dfrac{-1}{2} > 0$ and $1 + \left(\dfrac{-1}{2}\right) - 4 > 0$

But, $1 + 1 \times (-4) = 1 - 4$

$= -3 < 0$

So, $(1, -4) \notin R_1$

Class 11 Solutions Chapter 2 Relations Ex 2.3 Q22

We have,

$(a, b) R (c, d) \Leftrightarrow a + d = b + c$ for all (a, b), $(c, d) \in N \times N$

(i) We have,

$a + b = b + a$ for all $a, b \in N$

∴ $(a, b) R (a, b)$ for all, $a, b \in N$

(ii) Now,

$(a, b) R (c, d)$

$\Rightarrow$ $a + d = b + c$

$\Rightarrow$ $c + b = d + a$

$\Rightarrow$ $(c, d) R (a, b)$

(iii) Now,

$(a, b) R (c, d)$ and $(c, d) R (e, f)$

$\Rightarrow$ $a + d = b + c$ and $c + f = d + e$

$\Rightarrow$ $a + d + c + f = b + c + d + e$ [Adding]

$\Rightarrow$ $a + f = b + e$

$\Rightarrow$ $(a, b) R (e, f)$

********** END *********