



Class 11 Solutions Chapter 2 Relations Ex 2.1 Q1

By the definition of equality of ordered pairs

$$\begin{aligned} \left(\frac{a}{3} + 1, b - \frac{2}{3}\right) &= \left(\frac{5}{3}, \frac{1}{3}\right) \\ \Rightarrow \frac{a}{3} + 1 &= \frac{5}{3} \quad \text{and} \quad b - \frac{2}{3} = \frac{1}{3} \\ \Rightarrow \frac{a}{3} &= \frac{5}{3} - 1 \quad \text{and} \quad b = \frac{1}{3} + \frac{2}{3} \\ \Rightarrow \frac{a}{3} &= \frac{5-3}{3} \quad \text{and} \quad b = \frac{1+2}{3} \\ \Rightarrow \frac{a}{3} &= \frac{2}{3} \quad \text{and} \quad b = \frac{3}{3} \\ \Rightarrow a &= 2 \quad \text{and} \quad b = 1 \end{aligned}$$

By the definition of equality of ordered pairs

$$\begin{aligned} (x+1, 1) &= (3, y-2) \\ \Rightarrow x+1 &= 3 \quad \text{and} \quad 1 = y-2 \\ \Rightarrow x &= 3-1 \quad \text{and} \quad 1+2 = y \\ \Rightarrow x &= 2 \quad \text{and} \quad 3 = y \\ \Rightarrow x &= 2 \quad \text{and} \quad y = 3 \end{aligned}$$

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We have,

$$\begin{aligned} (x, -1) &\in \{(a, b) : b = 2a - 3\} \\ \text{and, } (5, y) &\in \{(a, b) : b = 2a - 3\} \\ \Rightarrow -1 &= 2 \times x - 3 \quad \text{and} \quad y = 2 \times 5 - 3 \\ \Rightarrow -1 &= 2x - 3 \quad \text{and} \quad y = 10 - 3 \\ \Rightarrow 3 - 1 &= 2x \quad \text{and} \quad y = 7 \\ \Rightarrow 2 &= 2x \quad \text{and} \quad y = 7 \\ \Rightarrow x &= 1 \quad \text{and} \quad y = 7 \end{aligned}$$

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We have,

$$\begin{aligned} a+b &= 5 \\ \Rightarrow a &= 5-b \\ \therefore b=0 &\Rightarrow a=5-0=5, \\ b=3 &\Rightarrow a=5-3=2, \\ b=6 &\Rightarrow a=5-6=-1, \end{aligned}$$

Hence, the required set of ordered pairs (a, b) is $\{(-1, 6), (2, 3), (5, 0)\}$

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