

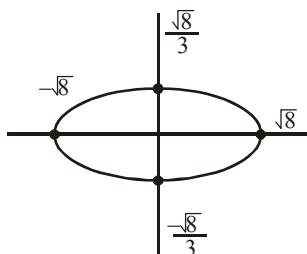


## SOLUTION

## 1. Official Ans. by NTA (2)

Sol.  $R = \{(x, y) : x, y \in \mathbb{Z}, x^2 + 3y^2 \leq 8\}$

For domain of  $R^{-1}$



Collection of all integral of  $y$ 's

For  $x = 0$ ,  $3y^2 \leq 8$

$\Rightarrow y \in \{-1, 0, 1\}$

## 2. Official Ans. by NTA (4)

Sol. Let  $a^2 + b^2 \in \mathbb{Q}$  &  $b^2 + c^2 \in \mathbb{Q}$

eg.  $a = 2 + \sqrt{3}$  &  $b = 2 - \sqrt{3}$

$a^2 + b^2 = 14 \in \mathbb{Q}$

Let  $c = (1 + 2\sqrt{3})$

$b^2 + c^2 = 20 \in \mathbb{Q}$

But  $a^2 + c^2 = (2 + \sqrt{3})^2 + (1 + 2\sqrt{3})^2 \notin \mathbb{Q}$

for  $R_2$  Let  $a^2 = 1$ ,  $b^2 = \sqrt{3}$  &  $c^2 = 2$

$a^2 + b^2 \notin \mathbb{Q}$  &  $b^2 + c^2 \notin \mathbb{Q}$

But  $a^2 + c^2 \in \mathbb{Q}$