Question :

Find the points on the line x+y = 4 which lie at a unit distance from the line 4x + 3y= 10

Sol. Let the required point be (h, k) lies on the line x + y = 4

i.e., $h + k = 4$ (i)

The distance of the point (h, k) from the line $4x + 3y = 10$ is:

$$\left|\frac{4h + 3k - 10}{\sqrt{16 + 9}}\right| = 1 \quad \text{(given)}$$

$\Rightarrow$ $4h + 3k - 10 = \pm 5$

This gives two results:

$4h + 3k = 15$ (ii)

$4h + 3k = 5$ (iii)

Solving (i) and (ii), we get $(h, k) \equiv (3, 1)$.

Solving (i) and (iii), we get $(h, k) \equiv (-7, 11)$.