

## Exemplar Problem

### Conic Section

45. The equation of the parabola having focus at  $(-1, -2)$  and the directrix  $x - 2y + 3 = 0$  is

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**Ans:**

Given, focus of parabola at  $S(-1, -2)$  and directrix is  $x - 2y + 3 = 0$

Any point on parabola is given by  $P(x, y)$

Then the length of the perpendicular from point  $S$  on the directrix =  $SP$

$$\Rightarrow \frac{(x - 2y + 3)^2}{5} = (x + 1)^2 + (y + 2)^2$$

$$\Rightarrow 5[x^2 + 2x + 1 + y^2 + 4y + 4] = x^2 + 4y^2 + 9 - 4xy - 12y + 6x$$

$$\Rightarrow 4x^2 + y^2 + 4x + 32y + 16 = 0$$

Hence, the equation of parabola is  $4x^2 + y^2 + 4x + 32y + 16 = 0$ .