

$$|x|^2 = 4a(-y)$$

$$x^2 = -4ay$$

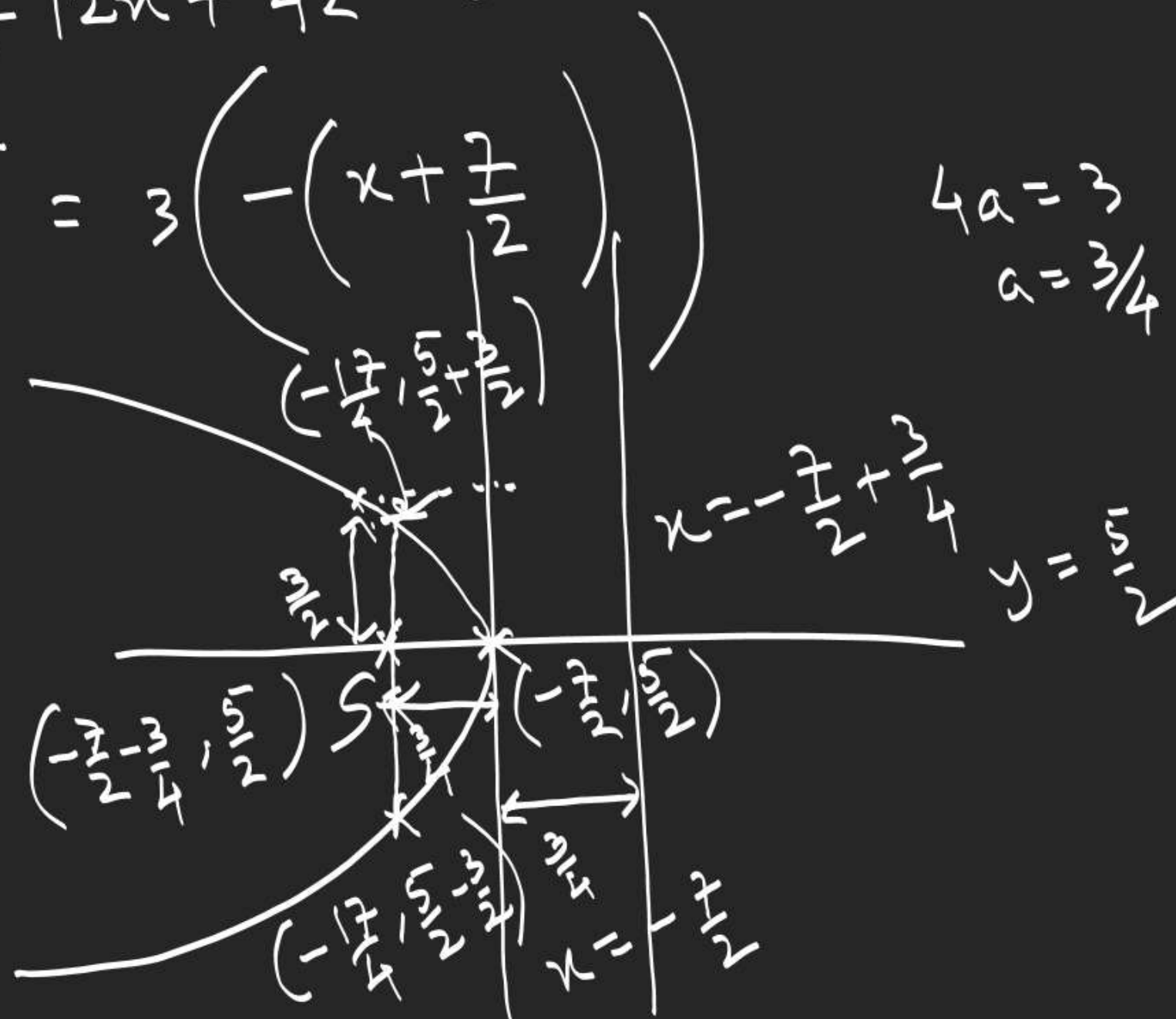
1. (i)  $4y^2 + 12x - 20y + 67 = 0$

$$4\left(y - \frac{5}{2}\right)^2 + 12x + 42 = 0$$

$$\left(y - \frac{5}{2}\right)^2 = 3\left(-\left(x + \frac{7}{2}\right)\right)$$

$$4a = 3$$

$$a = \frac{3}{4}$$

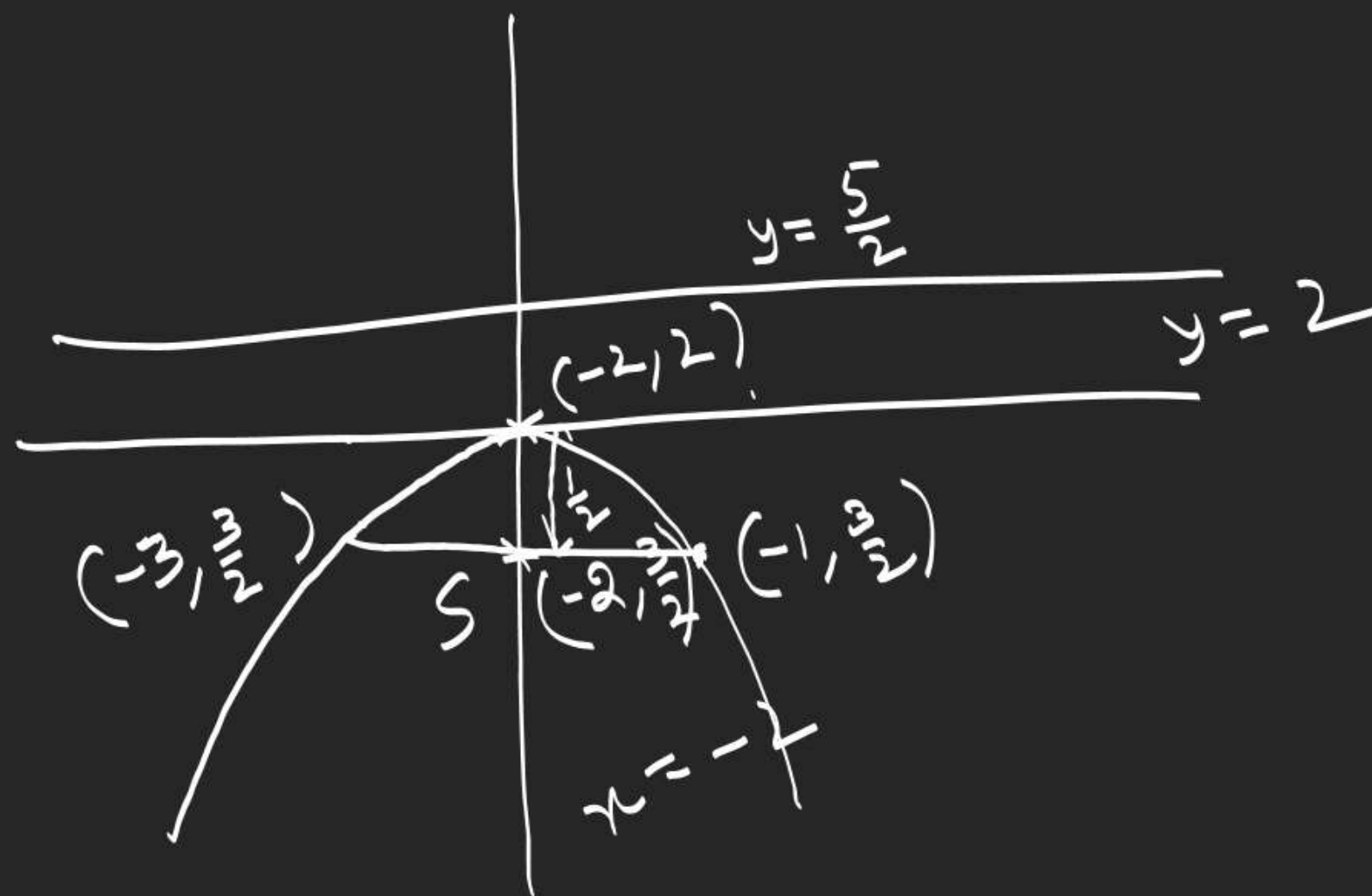


(ii)

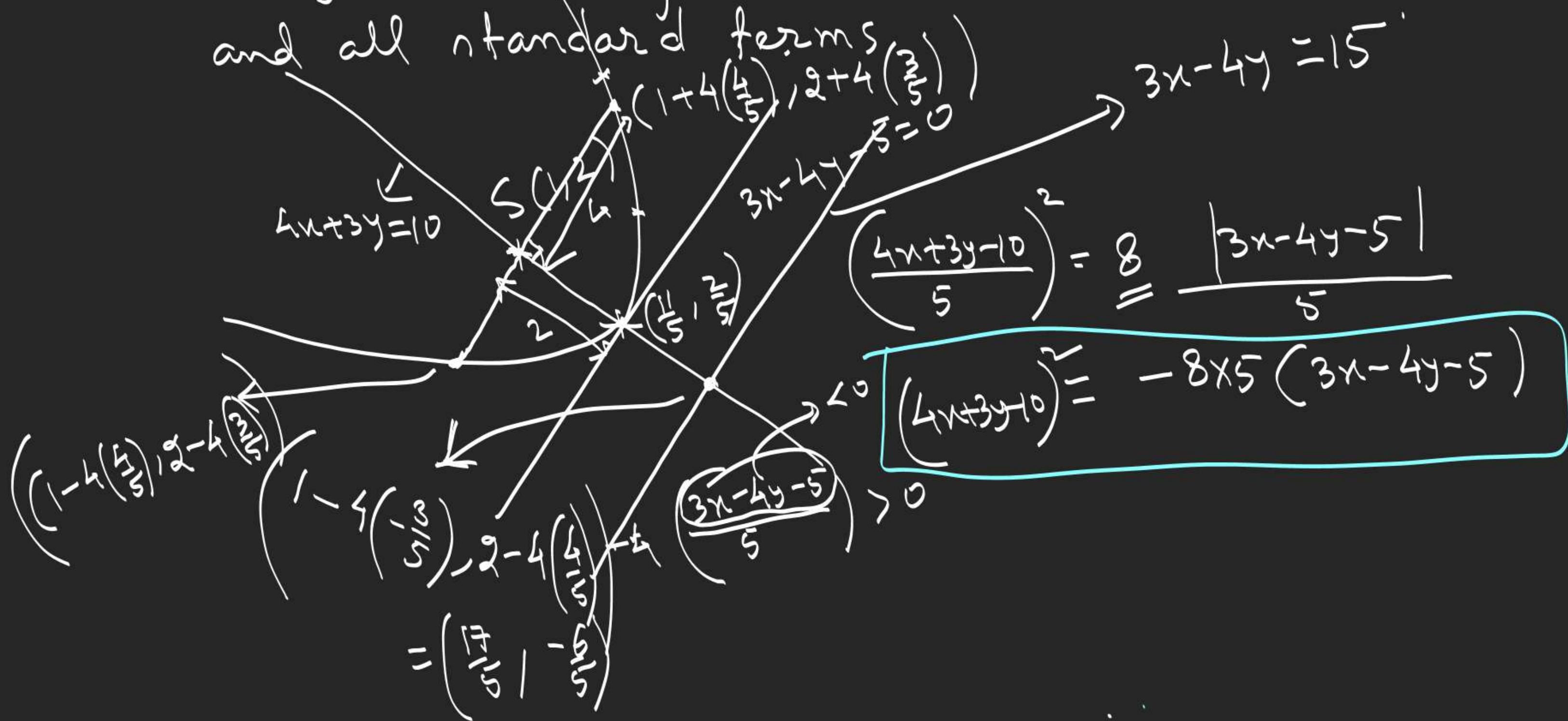
$$\underline{x^2 + 4x + 2y = 0}$$

$$(x+2)^2 = 2 \cdot (-y+2)$$

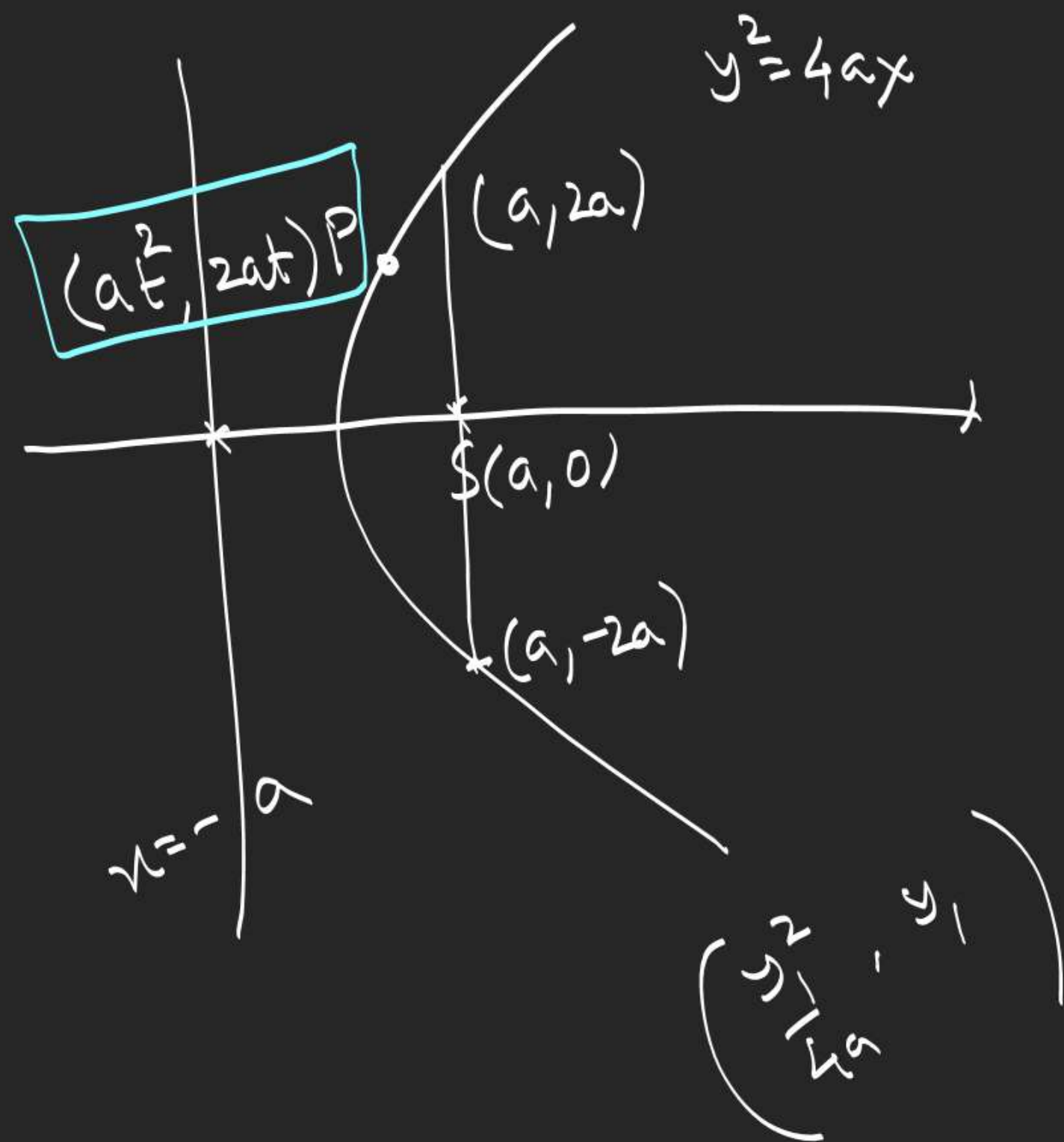
$$4a = 2$$



2. For some parabola, tangent at vertex is  $3x - 4y = 5$  and its focus is  $(1, 2)$ . Find the eqn. of parabola and all standard terms.







# Position of point with respect to parabola $y^2 = 4ax$ .

$$S = y^2 - 4ax$$

$(x_1, y_1) P$   
 $(x_1, \sqrt{4ax_1})$

$$|y_1| > \sqrt{4ax_1}$$

$$y_1^2 > 4ax_1$$

$$y_1^2 - 4ax_1 > 0$$

$\Rightarrow P$  lies outside

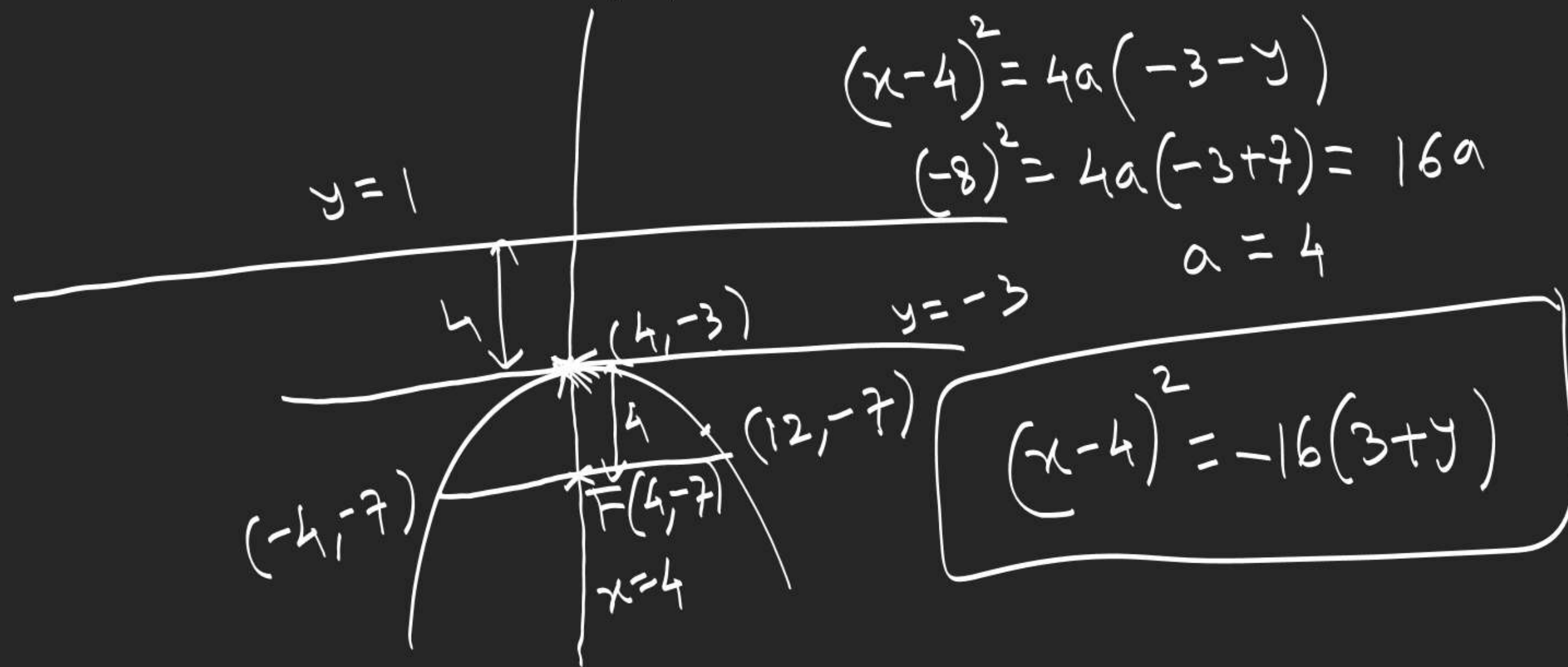
$\Rightarrow S_1 > 0 \Rightarrow P$  lies outside  
 $S_1 < 0 \Rightarrow$  — inside

$x_F$

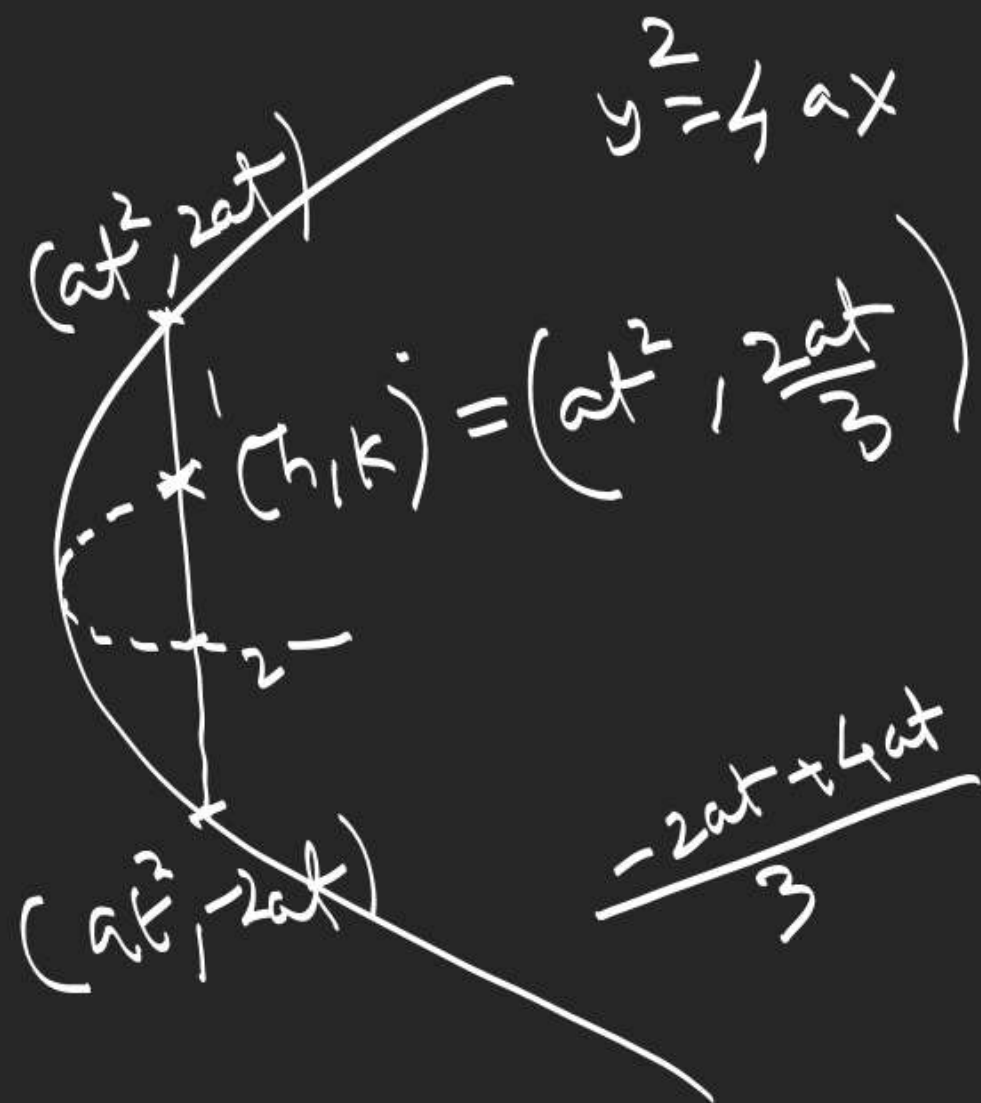
$PF < PM \Rightarrow P$  is inside  
outside  $y^2 = 4ax$



3. Find the eqn. of parabola passing through point  $(-4, -7)$  and whose directrix is parallel to  $x$ -axis and whose vertex is  $(4, -3)$ .



4. Find the locus of point of trisection of double ordinates of the parabola  $y^2 = 4ax$ .



$$h = at^2$$

$$k = \frac{2at}{3}$$

$$\frac{k^2}{h} = \frac{4a}{9}$$

$$9x - 4y^2 = 0$$

$$y^2 = \frac{4a}{9}x$$