Zadatak 53. Odredi skup točaka ravnine zadanih jednadžbom:

1) $9x^2 - 16y^2 - 18x - 135 = 0$;

2) $x^2 - y^2 - 2x - 8y + 10 = 0$;

3) $x^2 - y^2 - 4x + 6y - 5 = 0$.

Rješenje. **1)**

$$\begin{aligned} 9x^2 - 16y^2 - 18x - 135 &= 0 \\ 9(x^2 - 2x) - 16y^2 &= 135 \\ 9(x-1)^2 - 9 - 16y^2 &= 135 \\ 9(x-1)^2 - 16y^2 &= 144 \quad / : 144 \\ \frac{(x-1)^2}{16} - \frac{y^2}{9} &= 1 \end{aligned}$$

Hiperbola $\frac{(x-1)^2}{16} - \frac{y^2}{9} = 1$;

2)

$$\begin{aligned} x^2 - y^2 - 2x - 8y + 10 &= 0 \\ (x-1)^2 - 1 - (y+4)^2 + 16 + 10 &= 0 \\ (x-1)^2 - (y+4)^2 &= -25 \quad / \cdot (-1) \\ -(x-1)^2 + (y+4)^2 &= 25 \end{aligned}$$

Hiperbola $-(x-1)^2 + (y+4)^2 = 25$ s centrom simetrije $(1, -4)$;

3)

$$\begin{aligned} x^2 - y^2 - 4x + 6y - 5 &= 0 \\ (x-2)^2 - 4 - (y-3)^2 + 9 - 5 &= 0 \\ (y-3)^2 &= (x-2)^2 \quad / \sqrt{\ } \\ y - 3 &= \pm(x-2) \\ p_1 \ \ldots \ y - 3 &= x - 2 \\ y &= x + 1 \\ p_2 \ \ldots \ y - 3 &= -x + 2 \\ y &= -x + 5 \end{aligned}$$

Unija pravaca $y = x + 1$ i $y = -x + 5$.