Zadatak 3. Nacrtaj hiperbole zadane sljedećim jednadžbama:

1) $16x^2 - 9y^2 = 144$;

2) $\frac{x^2}{9} - \frac{y^2}{4} = 1$;

3) $x^2 - y^2 = 1$;

4) $4x^2 - y^2 = 4$.

Rješenje.

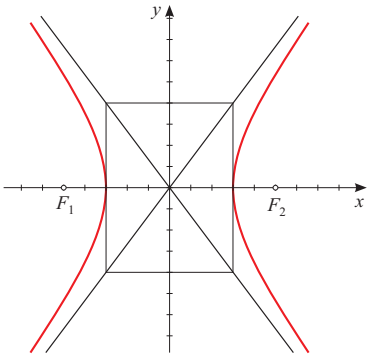
1)

$$16x^2 - 9y^2 = 144 \quad / : 144$$

$$\frac{x^2}{9} - \frac{y^2}{16} = 1 \implies a = 3\,, \quad b = 4$$

asimptote $\ldots\ y = \pm\frac{b}{a}x = \pm\frac{4}{3}x$

$$e^2 = a^2 + b^2 = 25 \implies e = 5 \implies F_{1,2}(\pm 5, 0)$$

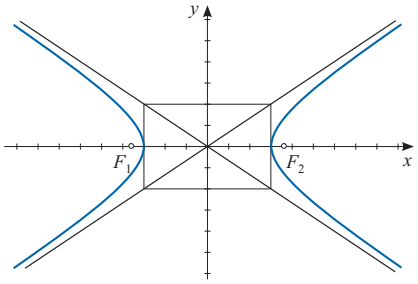


2)

$$\frac{x^2}{9} - \frac{y^2}{4} = 1 \implies a = 3\,, \quad b = 2$$

asimptote $\ldots\ y = \pm\frac{b}{a}x = \pm\frac{2}{3}x$

$$e^2 = a^2 + b^2 = 9 + 4 = 13 \implies e = \sqrt{13} \implies F_{1,2}(\pm\sqrt{13}, 0)$$

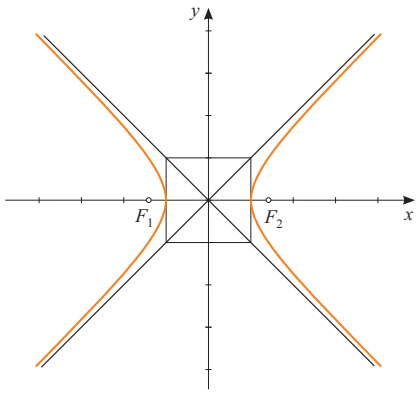


3)

$$x^2 - y^2 = 1 \implies \boxed{a = 1}, \quad \boxed{b = 1}$$

asimptote $\ldots\ y = \pm\frac{b}{a}x = \pm x$

$$e^2 = a^2 + b^2 = 1 + 1 = 2 \implies \boxed{e = \sqrt{2}} \implies \boxed{F_{1,2}(\pm\sqrt{2}, 0)}$$



4)

$$4x^2 - y^2 = 4 \quad / : 4$$

$$x^2 - \frac{y^2}{4} = 1 \implies \boxed{a = 1}, \quad \boxed{b = 2}$$

asimptote $\ldots\ y = \pm\frac{b}{a}x = \pm 2x$

$$e^2 = a^2 + b^2 = 1 + 4 = 5 \implies \boxed{e = \sqrt{5}} \implies \boxed{F_{1,2}(\pm\sqrt{5}, 0)}$$