

Zadatak 12. Pravac $y = \frac{3}{2}x$ asimptota je hiperbole $b^2x^2 - a^2y^2 = a^2b^2$. Ako je udaljenost žarišta hiperbole jednaka $4\sqrt{13}$, kako glasi njezina jednadžba?

Rješenje.

$$y = \frac{3}{2}x \implies \frac{b}{a} = \frac{3}{2}, \quad b = \frac{3}{2}a$$

$$d(F_1, F_2) = 2e = 4\sqrt{13} \implies e = 2\sqrt{13}$$

$$e^2 = a^2 + b^2$$

$$52 = a^2 + \left(\frac{3}{2}a\right)^2$$

$$\frac{13}{4}a^2 = 52 \quad / \cdot \frac{4}{13}$$

$$a^2 = 16 \implies a = 4$$

$$b = \frac{3}{2} \cdot 4 = 6 \implies b^2 = 36$$

$$H \quad \dots \quad \frac{x^2}{16} - \frac{y^2}{36} = 1 \quad / \cdot 144$$

$$9x^2 - 4y^2 = 144$$