

Zadatak 11. Kako glasi jednačba hiperbole čiji je linearni ekscentricitet jednak 5, a pravci $3x - 4y = 0$ i $3x + 4y = 0$ su njezine asimptote?

Rješenje.

$$e = 5$$

$$3x - 4y = 0 \implies y = \frac{3}{4}x, \quad \frac{b}{a} = \frac{3}{4}, \quad b = \frac{3}{4}a$$

$$3x + 4y = 0$$

$$a^2 = e^2 - b^2$$

$$a^2 = e^2 - \left(\frac{3}{4}a\right)^2$$

$$\frac{25}{16}a^2 = e^2$$

$$\frac{25}{16}a^2 = 25 \quad / \cdot \frac{16}{25}$$

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

$$b = \frac{3}{4} \cdot 4 = 3 \implies b^2 = 9$$

$$H \quad \dots \quad \frac{x^2}{16} - \frac{y^2}{9} = 1 \quad / \cdot 144$$

$$9x^2 - 16y^2 = 144$$