

**Zadatak 15.** Napiši jednadžbu elipse  $b^2x^2 + a^2y^2 = a^2b^2$  ako je njezin numerički ekscentricitet  $\varepsilon = \frac{e}{a}$  jednak  $\frac{1}{2}$ , a elipsa prolazi točkom  $T(2, 3)$ .

*Rješenje.*

$$\varepsilon = \frac{1}{2}$$

$$T(2, 3)$$

$$b^2x^2 + a^2y^2 = a^2b^2$$

$$T \dots 4b^2 + 9a^2 = a^2b^2$$

$$\varepsilon = \frac{e}{a} \quad /^2$$

$$\varepsilon^2 = \frac{e^2}{a^2}$$

$$\varepsilon^2 = \frac{a^2 - b^2}{a^2}$$

$$\frac{1}{4} = 1 - \frac{b^2}{a^2}$$

$$-\frac{3}{4} = -\frac{b^2}{a^2}$$

$$b^2 = \frac{3}{4}a^2$$

$$4 \cdot \frac{3}{4}a^2 + 9a^2 = a^2 \cdot \frac{3}{4}a^2$$

$$12a^2 = \frac{3}{4}a^4 \quad / : a^2$$

$$12 = \frac{3}{4}a^2 \quad / \cdot \frac{4}{3}$$

$$a^2 = 16 \implies b^2 = \frac{3}{4} \cdot 16 = 12$$

$$\frac{x^2}{16} + \frac{y^2}{12} = 1 \quad / \cdot 48$$

$$3x^2 + 4y^2 = 48$$