

## 38. Schulübung

$$\bullet) P = (2|2) \quad Q = (-4|1)$$

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

$$4b^2 + 4a^2 = a^2 b^2$$

$$(*) \quad \underline{16b^2 + a^2 = a^2 b^2} \quad ] -$$

$$-12b^2 + 3a^2 = 0$$

$$3a^2 = 12b^2$$

$$a^2 = 4b^2 \rightarrow \text{einsetzen in } (*)$$

$$16b^2 + 4b^2 = 4b^4$$

$$20b^2 = 4b^4 \quad | : b^2 (\neq 0)$$

$$20 = 4b^2 \quad | : 4$$

$$b^2 = 5 \Rightarrow a^2 = 4 \cdot 5 = 20$$

$$\underline{5x^2 + 20y^2 = 100} \quad \text{kürzen:} \quad \underline{x^2 + 4y^2 = 20}$$

$$\bullet) P = (\sqrt{6}|3) \quad Q = (4|-2)$$

$$6b^2 + 9a^2 = a^2 b^2$$

$$16b^2 + 4a^2 = a^2 b^2 \quad ] -$$

$$-10b^2 + 5a^2 = 0$$

$$a^2 = 2b^2$$

$$6b^2 + 18b^2 = 2b^4$$

$$24b^2 = 2b^4 \quad | : 2b^2$$

$$12 = b^2 \Rightarrow a^2 = 24$$

$$12x^2 + 24y^2 = 288 \quad | : 12$$

$$\underline{x^2 + 2y^2 = 24}$$

### Ermitteln von a, b und e:

•)  $2x^2 + 5y^2 = 20$  umwandeln in  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  | :20

$$\frac{2x^2}{20} + \frac{5y^2}{20} = 1$$

$$\frac{x^2}{10} + \frac{y^2}{4} = 1 \Rightarrow a = \sqrt{10} \quad b = 2$$

$$e^2 = a^2 - b^2 = 10 - 4 = 6 \Rightarrow e = \sqrt{6}$$

$$A = (-\sqrt{10} | 0) \quad B = (\sqrt{10} | 0)$$

$$C = (0 | 2) \quad D = (0 | -2)$$

$$F_1 = (-\sqrt{6} | 0) \quad F_2 = (\sqrt{6} | 0)$$

•)  $16x^2 + 25y^2 = 400$  | :400

$$\frac{x^2}{25} + \frac{y^2}{16} = 1 \Rightarrow a = 5 \quad b = 4$$

$$e = \sqrt{25 - 16} = 3$$

$$A = (-5 | 0) \quad B = (5 | 0)$$

$$C = (0 | 4) \quad D = (0 | -4)$$

$$F_1 = (-3 | 0) \quad F_2 = (3 | 0)$$

### Schnitt mit Gerade:

$$1) \quad X = \begin{pmatrix} 2 \\ 3 \end{pmatrix} + t \begin{pmatrix} 4 \\ -1 \end{pmatrix} \quad 3x^2 + 8y^2 = 140$$

$$x = 2 + 4t$$

$$y = 3 - t$$

$$3(4 + 16t + 16t^2) + 8(9 - 6t + t^2) = 140$$

$$12 + 48t + 48t^2 + 72 - 48t + 8t^2 = 140$$

$$56t^2 = 56 \Rightarrow t = \pm 1$$

$$\underline{S_1 = (-2 | 4) \quad S_2 = (6 | 2)}$$