

Aufgabe 3

$$(a) \frac{x^2}{19} - \frac{y^2}{4} = 1$$

$$(b) b^2 = c^2 - a^2 = 7 \Rightarrow \frac{x^2}{9} - \frac{y^2}{7} = 1$$

$$(c) 81 \cdot \frac{1}{a^2} - 16 \cdot \frac{1}{b^2} = 1 \Rightarrow \frac{1}{a^2} = \frac{1}{33} \Rightarrow \frac{x^2}{33} - \frac{y^2}{11} = 1$$

$$36 \cdot \frac{1}{a^2} - 1 \cdot \frac{1}{b^2} = 1 \quad \frac{1}{b^2} = \frac{1}{11}$$

Aufgabe 4

$$\frac{x^2}{8} - \frac{y^2}{4} = 1 \Rightarrow \begin{matrix} a^2 = 8 \\ b^2 = 4 \end{matrix} \Rightarrow \begin{matrix} a = \sqrt{8} \\ b = 2 \end{matrix} \Rightarrow y = \pm \frac{b}{a} x \Rightarrow y = \pm \frac{2}{\sqrt{8}} x$$

Aufgabe 5

$$k: \frac{x^2}{36} - \frac{y^2}{225} = 1 \Rightarrow \frac{x^2}{36} - \frac{400}{225} = 1 \Rightarrow y^2 = 100 \Rightarrow y = \pm 10$$

Aufgabe 6

$$\frac{x^2}{324} + \frac{y^2}{36} = 1 \Rightarrow \frac{u}{324} + \frac{v}{36} = 1 \Rightarrow \begin{matrix} u = 288 \\ v = 4 \end{matrix}$$

$$\frac{x^2}{144} - \frac{y^2}{4} = 1 \Rightarrow \frac{u}{144} - \frac{v}{4} = 1 \Rightarrow \begin{matrix} u = 288 \\ v = 4 \end{matrix}$$

$$S_1(12\sqrt{2}, 2), S_2(12\sqrt{2}, -2), S_3(-12\sqrt{2}, 2), S_4(-12\sqrt{2}, -2)$$

Aufgabe 7

$$\text{Hyperbel: } \frac{x^2}{36} - \frac{y^2}{144} = 1$$

$$\text{Polare: } \frac{1}{6}x - \frac{1}{24}y = 1$$

$$\text{Hyperbel} \cap \text{Polare: } S_1(6, 0), S_2(10, 16)$$