

$$\text{I} \quad 1) \quad \mathcal{L} = \{-1; 5\}$$

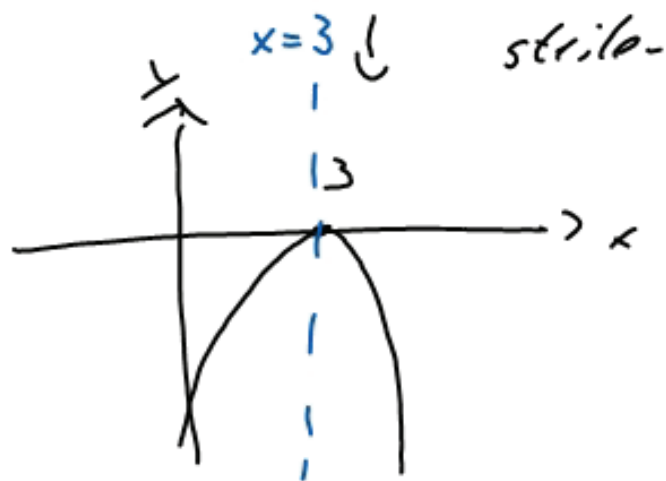
$$2) \quad \mathcal{L} = \{\emptyset\} \quad x^2 - 3x + 10 = 0 \rightarrow \left(\frac{3}{2}\right)^2 - 10 < 0$$

$$3) \quad \mathcal{L} = \{-8; -4\}$$

$$\text{II} \quad 4) \quad f(x) = -2 \cdot (x^2 - 6x + 9) = -2 \cdot (x-3)^2$$

$$S_x(3|0) = S(3|0)$$

$$S_y(0 | -18)$$



$$5) f(x) = \frac{1}{2} (x^2 + 20x + 64) = \frac{1}{2} (x + 16)(x + 4)$$

$$S_{x_1}(-16 | 10) \quad S_{x_1}(-4 | 10) \quad S_{y_1}(0 | 3?)$$

$$S(-10 | f(-10)) = S(-10 | -18)$$

$$\uparrow \text{ flache} \quad \hookrightarrow \frac{1}{2} \cdot (-10 + 16)(-10 + 4) = -18$$

$$x = -10 \quad \text{Symmetrieachse}$$

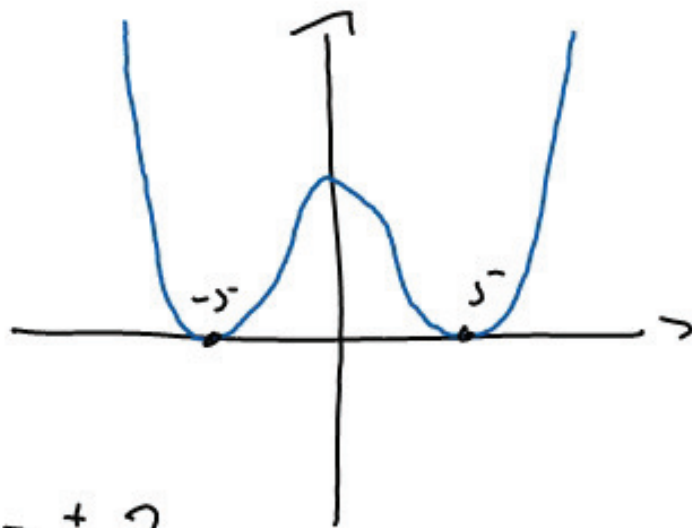
$$7) \quad x^4 - 24x^2 - 25 = 0 \quad \text{Substitution } z = x^2$$

$$z^2 - 24z - 25 = (z - 25)(z + 1) = 0$$

$$z_1 = 25 \quad \vee \quad z_2 = -1$$

Resubstitution $x = \pm \sqrt{z}$

$$x_{1,2} = \pm \sqrt{25} = \pm 5$$



$$8) \quad x^8 - 17x^4 + 16 = 0$$

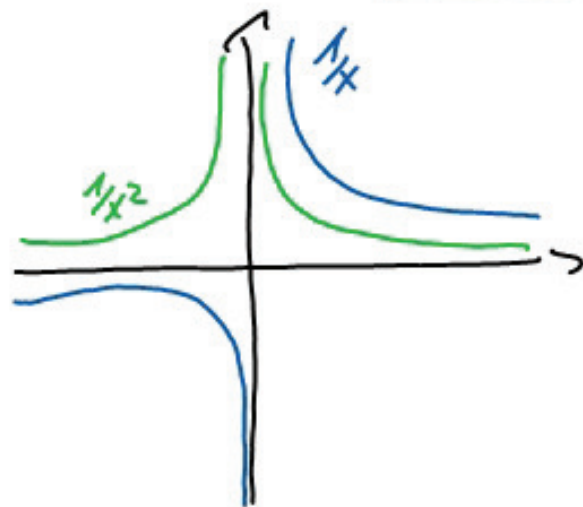
$$(x^4 - 1)(x^4 - 16)$$

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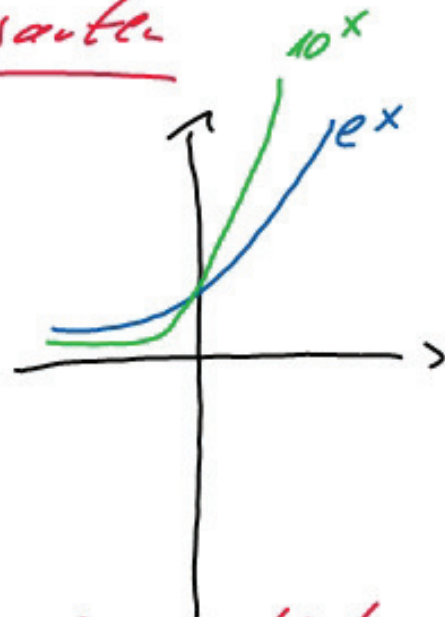
$$x_{1,2} = \pm 1 \quad \vee \quad x_{3,4} = \pm \sqrt[4]{16} = \pm 2$$

$$L = \{ -2; -1; 1; 2 \}$$

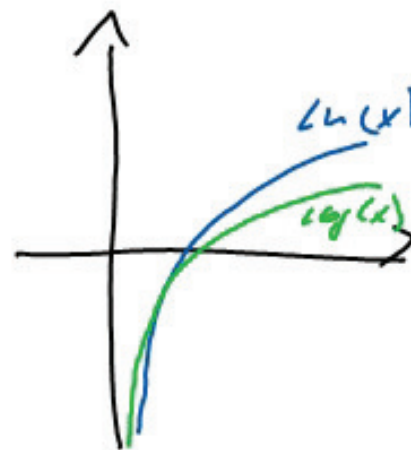
Funktionsarten



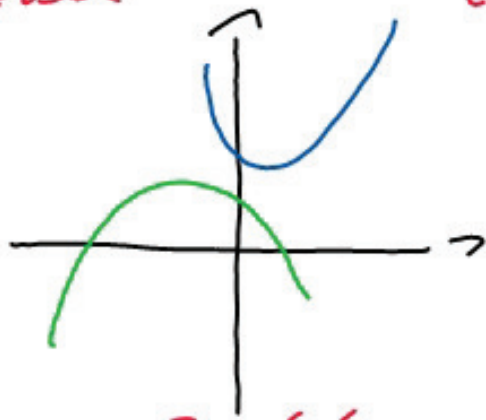
Hyperbol



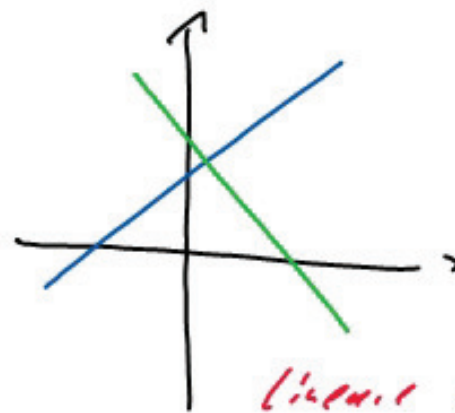
Exponential



Logarithmus



Parabol



Lineare Funktion

Ungleichungen

(Multiplikation mit
einer negativen Zahl
dreht das Ungleich-
heitszeichen um)

$$3 > 2 - \frac{1}{x} \quad | -2$$

$$\Rightarrow 1 > -\frac{1}{x} \quad | \cdot (-x)$$

$$\Rightarrow -x < 1 \quad | \cdot (-1)$$

$$x > (-1)$$

$$\mathcal{L} = \{x \in \mathbb{R} \mid x > -1\}$$

Betragsfunktion $f(x) = | \dots |$

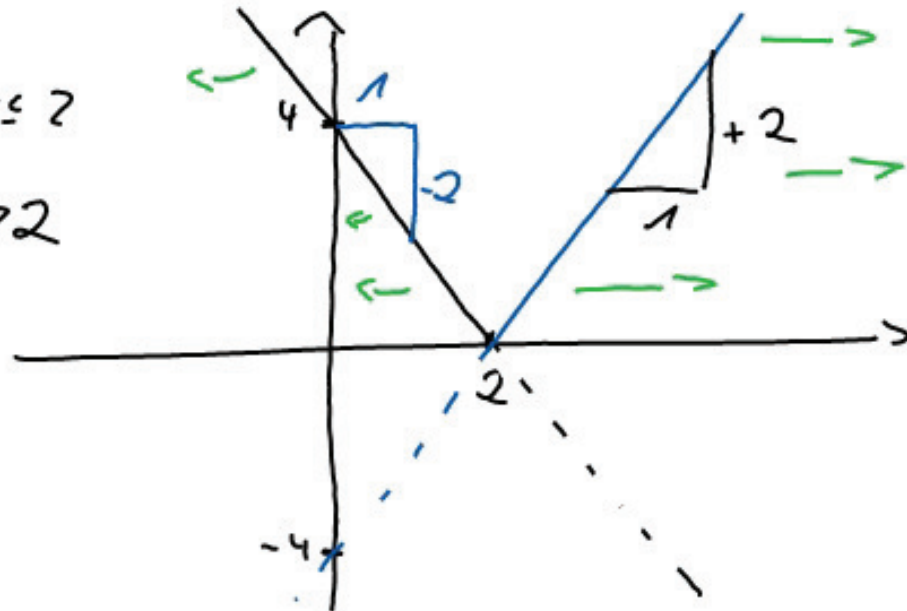
$$f(x) = |4 - 2x| \rightarrow x=2 \begin{array}{l} \xrightarrow{+} x \leq 2 : f(x) = 4 - 2x \\ \xrightarrow{-} x > 2 : f(x) = -(4 - 2x) \end{array}$$

$$f(10) = |4 - 20| = |-16| = 16$$

$$f(1) = |4 - 2| = |2| = 2$$

$$f(x) = \begin{cases} 4 - 2x ; x \leq 2 \\ 2x - 4 ; x > 2 \end{cases}$$

↳ gesplittete Funktion



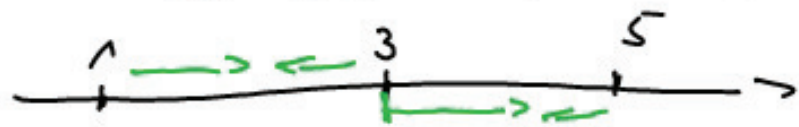
$$4) \quad |3-x| < 2$$

$\underbrace{\quad}_{\emptyset} \Rightarrow x=3$

$$* \quad 3 \cdot |8-2x| \leq 36 \quad (2016)$$

F	$x \geq 3: -(3-x) < 2 \quad \delta^-$	$x < 3: (3-x) < 2 \quad \delta^+$
R	$-3+x < 2 \quad +3$ $x < 5$	$3-x < 2 \quad +x - ?$ $x > 1$
E	$x \geq 3 \wedge x < 5$	$x > 1 \wedge x < 3$
P	$x=4: 3-4 = -1 =1 < 2$ \checkmark	$x=2: 3-2 =1 < 2 \quad \checkmark$
$\mathcal{L} = \{x \in \mathbb{R} \mid x > 1 \wedge x < 5\}$		

L



$$3 \cdot |8 - 2x| \leq 36 \quad | \cdot \frac{1}{3}$$

$$|8 - 2x| \leq 12$$

$$8 - 2x = 0 \quad x = 4 //$$

F	$x \geq 4 : -(8 - 2x) \leq 12$	$x < 4 : 8 - 2x \leq 12$
R	$-8 + 2x \leq 12$ $x \leq 10$	$-2x \leq 4$ $x \geq -2$
E	$x \geq 4 \wedge x \leq 10$	$x < 4 \wedge x \geq -2$
P	$x = 5 : 8 - 10 = 2 \leq 12$	$x = 0 : 8 - 0 = 8 \leq 12$
L	$\mathcal{K} = \{x \in \mathbb{R} \mid x \leq 10 \wedge x \geq -2\}$	