2) $6\cdot\ln\sqrt[3]{3} - 4\cdot\left[\ln\sqrt{\frac{\sqrt{2}}{x}} + \frac{1}{2}\cdot\ln\frac{9}{x}\right] = 2\ln\frac{\sqrt{x^3}}{3} - \frac{1}{4}\cdot\ln(16x^8) + 3\ln\frac{8}{x^2}$

$$\ln\left(3^{1/3}\right)^6 - \ln\left(\frac{2^{1/4}}{x^{1/2}}\right)^4 - \ln\left(\frac{9}{x}\right)^2 = \ln\left(\frac{x^{3/2}}{3}\right)^2 - \ln\left(16x^8\right)^{1/4} + \ln\left(\frac{8}{x^2}\right)^3$$

$$\ln\frac{3^2}{\frac{2}{x^2}\quad\frac{9^2}{x^2}} = \ln\frac{\frac{x^3}{3^2}\quad\frac{8^3}{x^6}}{2\,x^2} \qquad \big|\, e^x$$

$$\frac{x^4}{2\cdot 9} = \frac{2^8}{x^5\cdot 3^2} \qquad \big|\cdot x^5\cdot 3^2\cdot 2$$

$$x^9 = 2^9 \qquad \big|\sqrt[9]{}$$

$$x = 2 \qquad \Rightarrow \qquad \mathbb{L} = \{2\}$$

4) $f(x) = \log\left(\sqrt{2x+4} - 8\right) - 12$

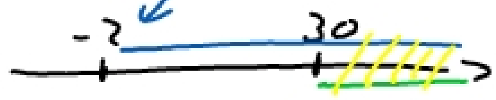
$\to \; 2x+4 = 0 \;\Rightarrow\; x = -2 \qquad \Rightarrow \; \mathbb{R}^{\geq -2}$

$\to \; \sqrt{2x+4} - 8 = 0 \qquad |+8$

$\sqrt{2x+4} = 8 \qquad |(\;)^2$

$2x+4 = 64 \qquad |-4 \;\; :2$

$x = 30$



$\Rightarrow \; \mathbb{R}^{>30}$

$\mathbb{D} = x \in \mathbb{R}^{>30}$

$\lim\limits_{x \to 30^+} f(x) = \log\left(\sqrt{64} - 8\right) - 12 = \log(0^+) - 12 = -\infty$

$\mathbb{W} = \mathbb{R}$

$\lim\limits_{x \to \infty} f(x) = \log\left(\sqrt{\infty} - 8\right) - 12 = \log(\infty) = \infty$

$$f(x) = x^2 + \alpha \cdot x + \beta$$

$$f(x) = (x+a)^2 + S \quad \rightarrow \quad S(-a \mid S)$$

$$f(x) = x^2 + 6x + 8$$

$\downarrow \sqrt{\ }$ $\quad \downarrow \cdot \frac{1}{2}$

$$(x + 3)^2 - 3^2 + 8$$

$- \uparrow^2$

$$f(x) = (x+3)^2 - 1 \quad \Rightarrow \quad S(-3 \mid -1)$$

$f(x) = 0$:

$$(x+3)^2 - 1 = 0 \quad \mid +1$$

$$(x+3)^2 = 1 \quad \mid \sqrt{\ }$$

$$x + 3 = \pm\sqrt{1} = \pm 1 \quad \mid -3$$

$$x_1 = -2 \quad \vee \quad x_2 = -4$$

$$x^2 + \alpha \cdot x + \beta = 0$$

$$\left(y + \frac{\alpha}{2}\right)^2 - \left(\frac{\alpha}{2}\right)^2 + \beta = 0 \qquad \Big| + \left(\frac{\alpha}{2}\right)^2 - \beta$$

$$\left(x + \frac{\alpha}{2}\right)^2 = \left(\frac{\alpha}{2}\right)^2 - \beta \qquad \Big| \sqrt{}$$

$$x + \frac{\alpha}{2} = \pm \sqrt{\left(\frac{\alpha}{2}\right)^2 - \beta} \qquad \Big| - \frac{\alpha}{2}$$

$$x_{1/2} = -\frac{\alpha}{2} \pm \sqrt{\left(\frac{\alpha}{2}\right)^2 - \beta}$$

$\alpha = p$

$\beta = q$

$$x_{1/2} = -p/2 \pm \sqrt{(p/2)^2 - q}$$

Satz v. Vieta

$$f(x) = (x+a)(x+b) = x^2 + a \cdot x + b \cdot x + a \cdot b$$

$$= x^2 + (a+b) \cdot x + a \cdot b$$

$$= x^2 + p \cdot x + q$$

$$x^2 + 8 \cdot x + 12 = 0$$

$$(x+2) \cdot (x+6) = 0$$

$$x_1 = -2 \lor x_2 = -6$$

$a \cdot b = 12$	$a + b = 8$
$1 \cdot 12$	13
$-1 \cdot (-12)$	-13
$3 \cdot 4$	7
$(-3) \cdot (-4)$	-7
$2 \cdot 6$	8
$(-2) \cdot (-6)$	-8

$$f(x) = -2x^2 + 4x + 16 \qquad | \cdot (-1/2)$$

$$-\frac{1}{2} \cdot f(x) = \ldots$$

$$f(x) = -2 \cdot (x^2 - 2x - 8)$$

$$= -2\left[(x-1)^2 - 1^2 - 8\right]$$

$$= -2\left[(x-1)^2 - 9\right]$$

$$= -2 \cdot (x-1)^2 + 18 \longrightarrow S(1 \mid 18)$$

4) $f(x) = -x^2+2x+3 = -(x^2-2x-3)$

$= -(x-3)(x+1)$

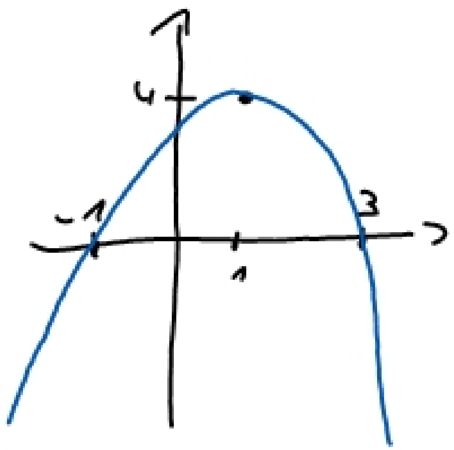
→ Parabel ist nach unten geöffnet, da $(-1)<0$

→ Normalparabel, da $|-1| = 1$

→ Achsenabschnitt $S_y(0|3)$

→ Nullstellen $S_{x_1}(3|0)$; $S_{x_2}(-1|0)$

→ Scheitelpunkt $(1|f(1)) = (1|4) \hat{=}$ HP



7) $x^4+100 = 29x^2 \quad |-29x^2$

$x^4-29x^2+100 = 0$

$\underbrace{(x^2-25)}_{x_{1/2}=\pm 5}\underbrace{(x^2-4)}_{x_{3/4}=\pm 2}$ ⇒ $\mathbb{L} = \{\pm 2; \pm 5\}$