2) $\ln 2^6 - \ln 2^2 \cdot x^{-2} + \ln 2^6 = \ln x^6 - \ln x^{-2} - \ln\left(\frac{1}{2^2}\right)^2$

$\frac{1}{2} \cdot \ln \frac{16}{x^4} = \frac{1}{2} \cdot \ln 16x^{-4} = \ln \left(16x^{-4}\right)^{\frac{1}{2}}$

$= \ln \sqrt{16x^{-4}} = \ln 4x^{-2} = \ln 2^2 x^{-2}$

$\to \ln \frac{2^6 \cdot 2^6}{2^2 x^{-2}} = \ln \frac{x^6}{x^{-2}\ \frac{1}{2^4}} \quad | \uparrow e$

$\frac{2^6 \cdot 2^6 \cdot x^2}{2^2} = x^6 \cdot x^2 \cdot 2^4$

$\frac{2^6 \cdot 2^6}{2^2 \cdot 2^4} = \frac{x^6\, x^2}{x^2}$

$2^6 = x^6 \qquad x = 2$

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

$$42 + \log\left(2 - \sqrt{x-2}\right)$$

$$x - 2 = 0$$
$$x = 2$$

$x = 1: \quad 1 - 2 = -1$ ↯

$x = 3 \quad 3 - 2 = +1$ ✓

$$\Rightarrow x \geq 2$$

$$2 - \sqrt{x-2} = 0$$
$$2 = \sqrt{x-2}$$
$$4 = x - 2$$
$$6 = x$$

$$x < 6$$

$x = 5 \quad 2 - \sqrt{3} > 0$

$x = 7 \quad 2 - \sqrt{5} < 0$

$$\mathbb{D} = \{ x \in \mathbb{R} \mid x \geq 2 \wedge x < 6 \}$$
$$\mathbb{L} = \mathbb{R}$$

5)

$$h(x) = \frac{4?}{\underbrace{\mathrm{ld}(3x+6)}}$$

$$3x + 6 = 0 \qquad x = -1 : 3$$

$$x = -2 \qquad x = -3 : -3$$

$$\boxed{x > -2}$$

$$\mathrm{ld}(3x+6) = 0$$

$$3x+6 = 2^0 = 1$$

$$x = -\tfrac{5}{3} = \boxed{-1\tfrac{2}{3}} = -1{,}\overline{6}$$

$$\mathbb{D} = \{ x \in \mathbb{R} \setminus \{-1\tfrac{2}{3}\} \mid x > -2 \}$$

Mitternachtsformel

$$ax^2 + b\cdot x + c = 0 \qquad | : a$$

$$x^2 + \underline{\frac{b}{a}\cdot x} + \boxed{\frac{c}{a}} = 0$$

$$\left(x + \frac{b}{2a}\right)^2 - \left(\frac{b}{2a}\right)^2 + \frac{c}{a} = 0 \qquad \left| + \left(\frac{b}{2a}\right)^2 - \frac{c}{a}\right.$$

$$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2}{4a^2} - \frac{4ac}{4a^2} = \frac{b^2 - 4ac}{4a^2} \qquad | \sqrt{}$$

$$\left[x^2 + \underline{2}\cdot x \cdot \underline{\frac{b}{2a}} + \left(\frac{b}{2a}\right)^2\right] - \left(\frac{b}{2a}\right)^2 + \boxed{\frac{c}{a}}$$

$$x + \frac{b}{2a} = \pm\sqrt{\frac{b^2 - 4ac}{4a^2}} = \pm \frac{\sqrt{b^2 - 4ac}}{2a} \qquad \left| - \frac{b}{2a}\right.$$

$$x_{1/2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$a = 1$

$$x_{1/2} = \frac{-b \pm \sqrt{b^2 - 4c}}{2}$$

$$= -\frac{b}{2} \pm \sqrt{\frac{b^2 - 4c}{4}}$$

$$= -\frac{b}{2} \pm \sqrt{\frac{b^2}{4} - c}$$

$$\left(\frac{b}{2}\right)^2$$

5) $f(x) = \frac{1}{4}x^2 + 2x + 3 = \frac{1}{4}\left[x^2 + 8x + 12\right]$

$= \frac{1}{4}\left[(x+6)(x+2)\right]$

<u>Verlauf</u>: gestaucht, da $|\frac{1}{4}| < 1$

oben geöffnet, da $\frac{1}{4} > 0$

<u>Schnittpunkte</u>: $S_y(0|3)$; $S_{x_1}(-6|0)$; $S_{x_1}(-2|0)$

<u>Scheitelpunkt</u>: $\frac{1}{4}\left[(x+4)^2 - 4^2 + 12\right] = \frac{1}{4}\left[(x+4)^2 - 4\right]$

$f(x) = \frac{1}{4}(x+4)^2 - 1 \to S(-4|1)$

<u>Symmetrie</u>: Achsensymmetrie durch Parallele zur y-Achse bei $x = -4$

1) $x^2 - 6x + 8 = 0$ $\qquad (x-4)(x-2)$

$x_{1/2} = \frac{6}{2} \pm \sqrt{9-8} = 3 \pm 1 = 4\,;\,2$

2) $x^2 - 4x - 5 = 0$ $\qquad (x-5)(x+1)$

$(x-\boxed{2})^2 - 4 - 5 = (x-2)^2 - 9 = 0$ $\qquad \mathbb{L} = \{5\,;\,-1\}$

$(x-2)^2 = 9$

$x - 2 = \pm 3 \;;\; x = \pm 3 + 2$

3) $x^2 - 10x + 16 = 0$ $\qquad (x-2)(x-8)$

$\mathbb{L} = \{8\,;\,2\}$

$(x-5)^2 - 25 + 16 = (x-5)^2 - 9 = 0$

$(x-5)^2 = 9 \qquad x - 5 = \pm 3 \qquad x = \pm 3 + 5$