1) $\log\left(2^8 \cdot x^8\right)^{1/4} - \log\left(\frac{3^{3/2}}{x^2}\right)^2 - \log\left(\frac{x^4}{3^2}\right)^{1/2}$

$\log\left(3^2 \cdot x^4\right)^{3/2} + \log\left(\frac{1}{2x^3}\right)^3 + \log\left(3^{3/2} x^{1/2}\right)^4$

$\log 2^2 \cdot x^2 - \log \frac{3^3}{x^4} - \log \frac{x^2}{3} = \log 3^3 x^6 + \log \frac{1}{2^3 x^9} + \log 3^6 x^2$

$\log \frac{2^2 x^2 x^4 3}{3^3 x^2} = \log \frac{3^3 x^6 \; 3^6 x^2}{2^3 x^9} \quad \Big| \uparrow_1^{10^x}$

$\frac{2^2 x^4}{3^2} = \frac{3^9}{2^3 x}$

$x^5 = \frac{3^{11}}{2^5}$

$x = \frac{1}{2}\sqrt[5]{3^{11}} \approx 4{,}5$

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

$2x+4 = 0 \quad x = -2$

$x = -3 \Rightarrow < 0$

$x = -1 \Rightarrow > 0$

① $x \geq -2$

$\sqrt{2x+4} - 8 = 0$

$\sqrt{2x+4} = 8$

$2x+4 = 64$

$2x = 60$

$x = 30$

$x > 30$

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

$x = 31 \quad > 0$ ✓

$x = 29 \quad < 0$ ✗

II 3) $\dfrac{3x}{\ln(15-3x)}$ ($\ln(15-3x) > 0$)

$15-3x = 0 \quad x = 5$

$x = 6 \quad < 0$

$x = 4 \quad > 0$

$x < 5$

$\ln(15-3x) = 0$

$e^0 = 15-3x = 1$

$x = 14/3 = 4\,2/3$

$D = \{x \in \mathbb{R} \setminus \{4\,2/3\} \mid x < 5\}$

$$ax^2 + bx + c = 0 \qquad | : a$$

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

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

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

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

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

$a = 1$

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

$$= -\frac{b}{2} \pm \sqrt{\frac{b^2 - 4c}{4}} = \boxed{-\frac{b}{2} \pm \sqrt{\left(\frac{b}{2}\right)^2 - c}}$$

1) $x^2 - 6x + 8 = (x-2)(x-4) = 0$ $\quad x_1 = 2 \; ; \; x_2 = 4$

$x_{1/2} = 3 \pm \sqrt{3^2 - 8} = 3 \pm 1$

8: $1 \cdot 8 \to 8$
$(-1)\cdot(-8) \to -8$
$4 \cdot 2 \to 6$
$\checkmark\ (-4)\cdot(-2) \to -6$

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

$x_1 = 5 \; ; \; x_2 = -1$

$(x-2)^2 - 2^2 - 5 = (x-2)^2 - 9 = 0$

$(-2)^2 = 4$

$-2^2 = -4$

$(x^2 - 4x + 4) - 4 - 5 = x^2 - 4x - 5$

$(x-2)^2 = 9$

$x - 2 = \pm 3$

$x_{1/2} = \pm 3 + 2$

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

$x_{1/2} = 5 \pm \sqrt{25 - 16} = 5 \pm 3$ $\quad x_1 = 2 \; ; \; x_2 = 8$