Lösungen Nr. 1   1.5 P

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a) $\sqrt[3]{\dfrac{8a^{14}}{a^{-4}}} = \sqrt[3]{8a^{18}} = \underline{2a^6}$ 0.5 P

b) $\dfrac{a^2 - 9}{a^2 - ab + 3a - 3b} = \dfrac{(a+3)(a-3)}{(a+3)(a-b)} = \underline{\dfrac{a-3}{a-b}}$ 1 P

Lösungen Nr. 2   1.5 P

$y = a(x-u)^2 + w$ 0.5 P

$y = -3(x-2)^2 + 12$ 0.5 P

$y = -3(x^2 - 4x + 4) + 12$

$y = -3x^2 + 12x - 12 + 12$

$\underline{\underline{y = -3x^2 + 12x}}$ 0.5 P

Lösungen Nr. 3   1.5 P

$\overrightarrow{BC} = \begin{pmatrix} 3 - 18 \\ -9 - 9 \\ 21 - 12 \end{pmatrix} = \begin{pmatrix} -15 \\ -18 \\ 9 \end{pmatrix}$ 0.5 P

$\overrightarrow{OD} = \overrightarrow{OA} + \overrightarrow{BC}$

$\overrightarrow{OD} = \begin{pmatrix} 9 \\ 3 \\ 6 \end{pmatrix} + \begin{pmatrix} -15 \\ -18 \\ 9 \end{pmatrix} = \begin{pmatrix} -6 \\ -15 \\ 15 \end{pmatrix} \quad \rightarrow \quad \underline{D = (-6 \,/\, -15 \,/\, 15)}$ 0.5 P
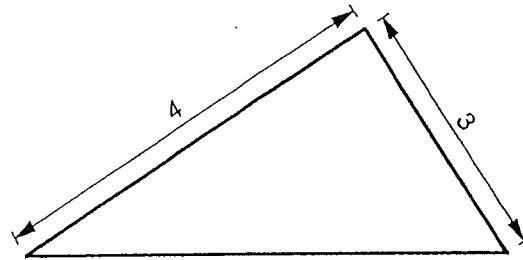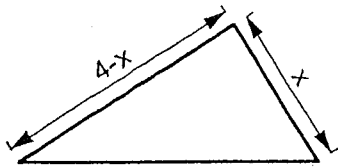
$\overrightarrow{OS} = \dfrac{\overrightarrow{OA} + \overrightarrow{OC}}{2} = \dfrac{\begin{pmatrix} 9 \\ 3 \\ 6 \end{pmatrix} + \begin{pmatrix} 3 \\ -9 \\ 21 \end{pmatrix}}{2} = \begin{pmatrix} 6 \\ -3 \\ 13.5 \end{pmatrix} \quad \rightarrow \quad \underline{\underline{S = (6 \,/\, -3 \,/\, 13.5)}}$ 0.5 P

Lösungen Nr. 4   1.5 P

die beiden Dreiecke sind ähnlich!   0.5 P

$$\frac{4}{3} = \frac{4-x}{x}$$ 0.5 P

$4x = 12 - 3x$

$7x = 12$

$$x = \frac{12}{7} = 1\frac{5}{7}$$ 0.5 P

Lösungen Nr. 5   1.5 P

$$\frac{2x}{x-2} - \frac{2x-4}{x-3} = \frac{-4}{(x-2)(x-3)} \quad \rightarrow \quad D = \mathbb{R} \setminus \{2 \, ; 3\}$$ 0.5 P

$2x(x-3) - (2x-4)(x-2) = -4$

$2x^2 - 6x - (2x^2 - 8x + 8) = -4$

$2x^2 - 6x - 2x^2 + 8x - 8 = -4$ 0.5 P

$2x - 8 = -4$

$2x = 4$

$x = 2 \quad \rightarrow \quad L = \{ \ \}$ 0.5 P

Lösungen Nr. 6   1.5 P

a) $y = x^2 + 1$

$x^2 = y - 1$

$x = +\sqrt{y - 1}$ / Variablentausch $\boxed{0.5 \text{ P}}$

$\underline{\underline{y = \sqrt{x - 1}}}$ $\boxed{0.5 \text{ P}}$

b)
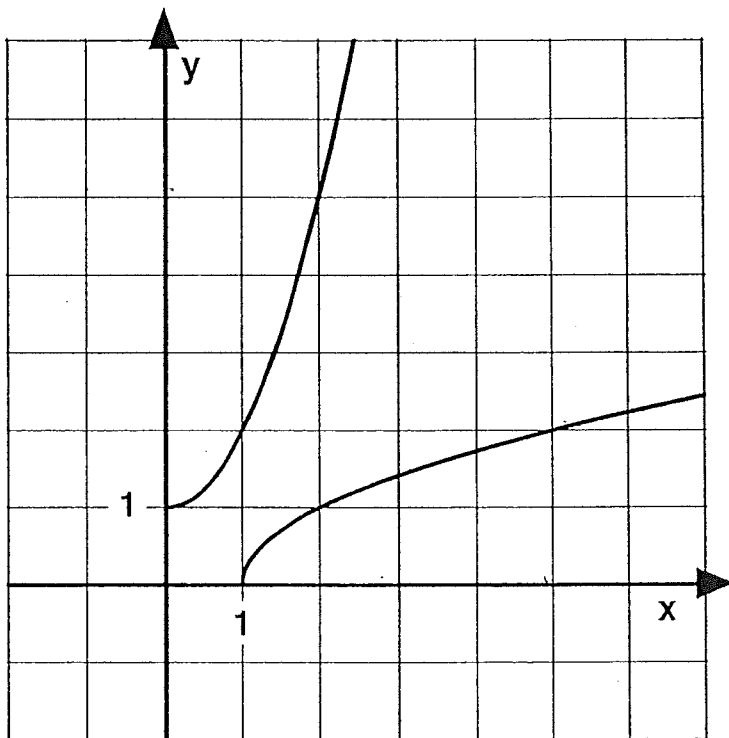
$\boxed{0.5 \text{ P}}$

Lösungen Nr. 7   1.5 P

$\log_5 2 + \log_5 x = \log_5 25 + \log_5 1$ 0.5 P

$\log_5 2x = \log_5 25$ 0.5 P

$2x = 25$

$\underline{\underline{x = 12.5}}$ 0.5 P

Lösungen Nr. 8   1.5 P

$g: \overrightarrow{OP} = \begin{pmatrix} 12 \\ 30 \\ 18 \end{pmatrix} + t \cdot \begin{pmatrix} 3 \\ 1 \\ -3 \end{pmatrix}$ 0.5 P

$z = 0 \;\rightarrow\; 18 - 3t = 0 \;\rightarrow\; t = 6$ 0.5 P

$\overrightarrow{OD} = \begin{pmatrix} 12 \\ 30 \\ 18 \end{pmatrix} + 6 \cdot \begin{pmatrix} 3 \\ 1 \\ -3 \end{pmatrix} = \begin{pmatrix} 30 \\ 36 \\ 0 \end{pmatrix} \;\rightarrow\; \underline{\underline{D = \left(30 / 36 / 0 \right)}}$ 0.5 P