

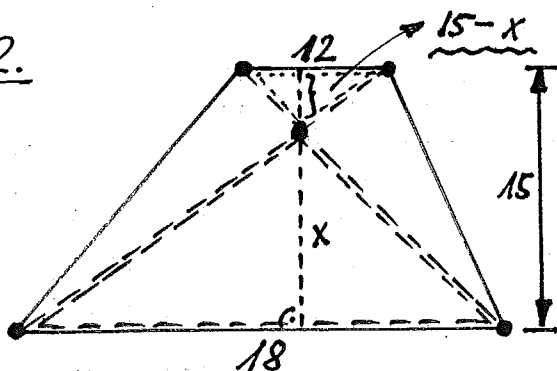
Übungsserie Mathematik Teil A

1.
$$\frac{a^2}{2(a+1)} + \frac{a+b}{4(a+1)} + \frac{a(b-a)}{4(a+1)} = ?$$

$$\frac{2a^2 + a + b + ab - a^2}{4(a+1)} = \frac{a^2 + a + b + ab}{4(a+1)} = ?$$

$$\frac{a(a+1) + b(a+1)}{4(a+1)} = \frac{(a+1)(a+b)}{4(a+1)} = \frac{a+b}{4}$$

2.



→ Ähnliche Dreiecke:

$$\frac{x}{18} = \frac{15-x}{12} \quad ?$$

$$12x = 270 - 18x$$

$$30x = 270 \Rightarrow \underline{x = 9}$$

$$\underline{A_{III}} = \frac{18 \cdot 9}{2} = \underline{81}$$

3.

a.)
$$\frac{(2^3)^5 \cdot (2^2)^6}{(2^4)^7} = \frac{2^{15} \cdot 2^{12}}{2^{28}} = \frac{2^{27}}{2^{28}} = \frac{1}{2}$$

b.)
$$\sqrt[3]{\sqrt[2]{a^{16} \cdot a^{10} \cdot a^4}} = \sqrt[6]{a^{30}} = \underline{a^5}$$

4.

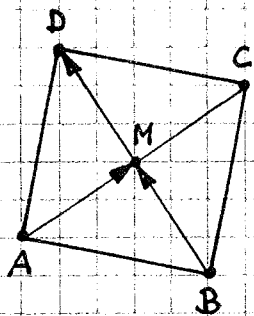
$$2x^2 - 6x - 56 = 0 \Rightarrow x^2 - 3x - 28 = 0$$

$$x_{1/2} = \frac{3 \pm \sqrt{9 + 4 \cdot 28}}{2} \rightarrow \underline{x_1 = 7}$$

$$\rightarrow \underline{x_2 = -4}$$

$$\underline{L = \{7; -4\}}$$

5.



Geg: $A(10/10)$; $C(24/22)$

Ges: a.) M ; b.) B ; D

$$a.) M\left(\frac{10+24}{2} \mid \frac{10+22}{2}\right) = \underline{\underline{(17/16)}}$$

$$b.) \vec{AM} = \begin{pmatrix} 7 \\ 6 \end{pmatrix} \Rightarrow \vec{MD} = \begin{pmatrix} -6 \\ 7 \end{pmatrix} \text{ da } \underline{b}.$$

$$\vec{MD} = \begin{pmatrix} -6 \\ 7 \end{pmatrix} = \begin{pmatrix} x_D - 17 \\ y_D - 16 \end{pmatrix} \rightarrow \begin{matrix} x_D = 11 \\ y_D = 23 \end{matrix} \Rightarrow \underline{\underline{D(11/23)}}$$

$$\vec{BM} = \begin{pmatrix} -6 \\ 7 \end{pmatrix} = \begin{pmatrix} 17 - x_B \\ 16 - y_B \end{pmatrix} \rightarrow \begin{matrix} x_B = 23 \\ y_B = 9 \end{matrix} \Rightarrow \underline{\underline{B(23/9)}}$$

6.

Parabel: $y = ax^2 + bx + c \rightarrow A(0/7)$

$B(1/4)$

$C(-1/14)$

$$\begin{cases} 7 = c \\ 4 = a + b + c \\ 14 = a - b + c \end{cases} \rightarrow \underline{c = 7}$$

$$\begin{cases} -3 = a + b \\ 7 = a - b \end{cases} \oplus \ominus$$

$$4 = 2a$$

$$\rightarrow \underline{a = 2}$$

$$-10 = 2b$$

$$\rightarrow \underline{b = -5}$$

$$\left. \begin{matrix} a = 2 \\ b = -5 \\ c = 7 \end{matrix} \right\} \underline{\underline{y = 2x^2 - 5x + 7}}$$

7.

a.) $y = 2^x \rightarrow$ Umkehrfunktion: $\log_2 \hat{=} \text{lb}$

$$\text{lb } y = x \cdot \underbrace{\text{lb } 2}_1 \Rightarrow \underline{\underline{y = \text{lb } x \hat{=} \log_2 x}}$$

b.) Umkehrfunktion: Spiegel an $y = x$

8.

$$\frac{1}{2} \lg(x+1) = 2 - \lg 5$$

$$\lg \sqrt{x+1} = 2 - \lg 5$$

$$\lg \sqrt{x+1} + \lg 5 = 2$$

$$\lg 5 \cdot \sqrt{x+1} = 2$$

$$5 \cdot \sqrt{x+1} = 100 \rightarrow \sqrt{x+1} = 20$$

$$x+1 = 400 \rightarrow \underline{\underline{x = 399}} \rightarrow \text{Probe!}$$