

Lösungen Abschlusstraining 1

$$1. \text{ a) } \frac{3x^2-30x+75}{3(x^2-25)} = \frac{3(x^2-10x+25)}{3(x+5)(x-5)} = \frac{3(x-5)(x-5)}{3(x+5)(x-5)} = \frac{(x-5)}{\underline{\underline{(x+5)}}}$$

$$\text{b) } \frac{x}{2x-12} + \frac{1}{2} = \frac{6}{x-6}$$

$$\frac{x}{2(x-6)} + \frac{1}{2} = \frac{6}{(x-6)} \quad / \cdot 2(x-6) \quad \underline{x \neq 6}$$

$$x + x - 6 = 12 \quad / +6$$

$$2x = 18 \quad / :2$$

$$\underline{\underline{x = 9}}$$

$$2. \text{ a) } \frac{3-x}{5} < \frac{5-3x}{3} - \frac{x-1}{6} \quad / \cdot 30$$

$$6(3-x) < 10(5-3x) - 5(x-1)$$

$$18 - 6x < 50 - 30x - 5x + 5$$

$$18 - 6x < 55 - 35x \quad / +35x$$

$$18 + 29x < 55 \quad / -18$$

$$29x < 37 \quad / :29$$

$$x < 1,27\dots$$

$$\underline{\underline{L = \{1; 0; -1; -2\}}}$$

$$\text{b) } 4x = \frac{33}{(x+3)(x-2)} - \frac{104}{(2-x)(2+x)}$$

$$\underline{\underline{x \neq -3}} \quad \underline{\underline{x \neq 2}} \quad \underline{\underline{x \neq -2}}$$

$$3. \text{ a) } \quad \frac{6x+3}{6} + 1 > \frac{5x-4}{15} \quad / \cdot 30$$

$$5(6x + 3) + 30 > 2(5x - 4)$$

$$30x + 15 + 30 > 10x - 8 \quad / -10x$$

$$20x + 45 > -8 \quad / -45$$

$$20x > -53 \quad / : 20$$

$$x > -2,65$$

$$\underline{L = \{-2; -1; 0; 1\}}$$

b)

Jüngste Nonne	$x - 6$	<u>32 Jahre alt</u>
Mittlere Nonne	x	<u>38 Jahre alt</u>
Älteste Nonne	$2x - 6 - 29$	<u>41 Jahre alt</u>
Total	$3 \cdot 37$	

$$x - 6 + x + 2x - 6 - 29 = 3 \cdot 37$$

$$4x - 41 = 111 \quad / +41$$

$$4x = 152 \quad / : 4$$

$$\underline{x = 38}$$

$$4. \quad \text{Orangensaft: } x \quad x + 2x + 2x + 60 = 300$$

$$\text{Mineralwasser: } 2x \quad 5x + 60 = 300 \quad / -60$$

$$\text{Coca Cola: } 2x + 60 \quad 5x = 240 \quad / : 5$$

$$\text{Total: } 300 \quad x = 48$$

Er hat 48 Flaschen Orangensaft bestellt.

5. Bar $1990 \cdot 0,97 = 1930,30Fr.$

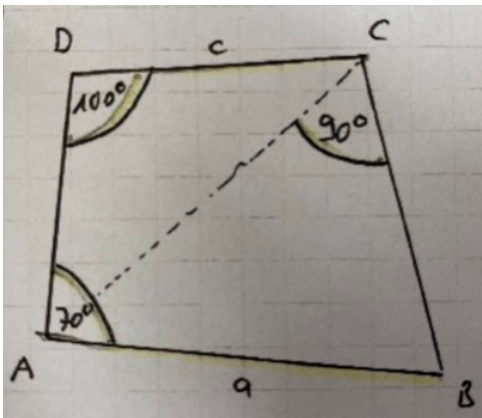
Anzahlung $1990 \cdot 0,2 = 398Fr.$

+ 24 Raten $24 \cdot 75 = \underline{1800Fr.}$

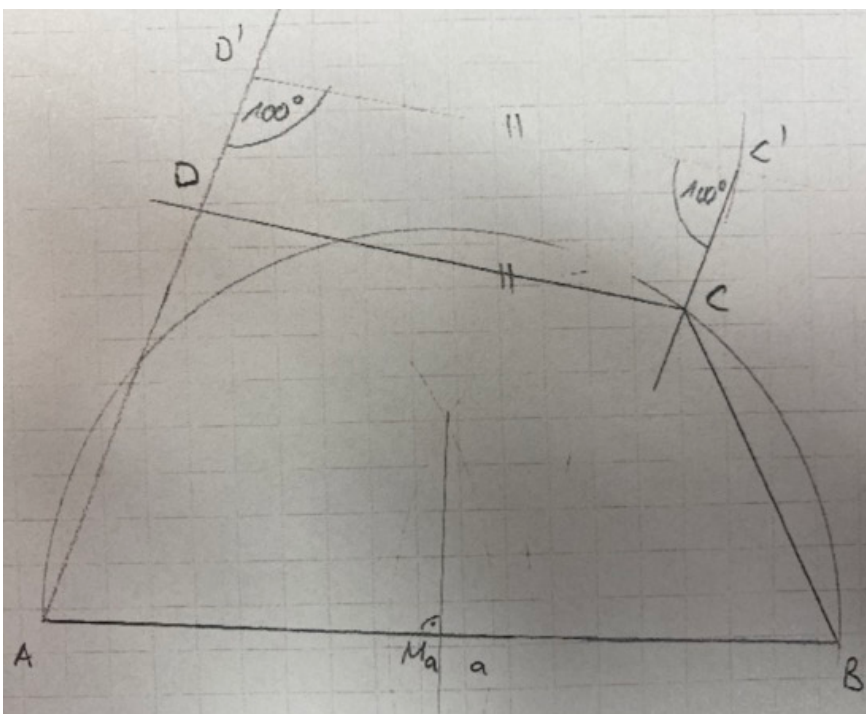
$2198Fr.$

%: $\frac{2198-1930,3}{1930,3} = \frac{267,7}{1930,3} = 0,139 = \underline{\underline{13,9\% \text{ teurer}}}$

6.



- KB:
1. $a \rightarrow A, B$
 2. α in A , δ in D'
 3. $\odot (D', c) \rightarrow C'$
 4. 100° in $C' \cap \text{Thaleskreis } \overline{AB} \rightarrow C$
 5. 100° in $C \rightarrow D$



$$7. \quad \left[\left(\frac{a+x}{2x} \right)^2 - \left(\frac{a-x}{2x} \right)^2 \right] - \frac{\frac{a+x}{x} - \frac{2x}{x-a}}{\frac{a^2+x^2}{x-a}} =$$

$$\left(\frac{a+x}{2x} \right)^2 - \left(\frac{a-x}{2x} \right)^2 = \frac{(a+x)(a+x)}{2x \cdot 2x} - \frac{(a-x)(a-x)}{2x \cdot 2x} = \frac{a^2+2ax+x^2 - (a^2-2ax+x^2)}{4x^2} =$$

$$\frac{a^2+2ax+x^2 - a^2+2ax-x^2}{4x^2} = \frac{4ax}{4x^2} = \frac{a}{x}$$

$$\frac{a+x}{x} - \frac{2x}{x-a} = \frac{(a+x)(x-a) - 2x^2}{x(x-a)} = \frac{ax - a^2 + x^2 - ax - 2x^2}{x(x-a)} = \frac{-a^2 - x^2}{x(x-a)} = \frac{-(a^2+x^2)}{x(x-a)}$$

$$\frac{a^2+x^2}{x-a} = \frac{(a^2+x^2)}{(x-a)}$$

$$\frac{\frac{-(a^2+x^2)}{x(x-a)}}{\frac{(a^2+x^2)}{(x-a)}} = \frac{-(a^2+x^2)(x-a)}{x(x-a)(a^2+x^2)} = \frac{-1}{x}$$

$$\frac{a}{x} - \frac{-1}{x} = \frac{a}{x} + \frac{1}{x} = \frac{a+1}{x}$$

$$8. \quad \frac{4a+1}{(2a+1)^2} : \frac{2a+1 - \frac{16a^2}{8a+4}}{2a+1 - \frac{4a+2}{2a+1}} =$$

$$\frac{4a+1}{(2a+1)^2} = \frac{(4a+1)}{(2a+1)(2a+1)}$$

$$\frac{2a+1}{1} - \frac{16a^2}{4(2a+1)} = \frac{2a+1}{1} - \frac{4a^2}{(2a+1)} = \frac{(2a+1)(2a+1) - 4a^2}{(2a+1)} = \frac{4a^2+4a+1-4a^2}{(2a+1)} =$$

$$\frac{4a+1}{(2a+1)} = \frac{(4a+1)}{(2a+1)}$$

$$2a+1 - \frac{4a+2}{2a+1} = \frac{2a+1}{1} - \frac{4a+2}{(2a+1)} = \frac{(2a+1)(2a+1) - (4a+2)}{(2a+1)} =$$

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

$$\frac{\frac{(4a+1)}{(2a+1)}}{\frac{(2a-1)}{1}} = \frac{(4a+1)}{(2a+1)(2a-1)}$$

$$\frac{(4a+1)}{(2a+1)(2a+1)} : \frac{(4a+1)}{(2a+1)(2a-1)} = \frac{(4a+1)(2a+1)(2a-1)}{(2a+1)(2a+1)(4a+1)} = \frac{(2a-1)}{(2a+1)}$$