

Es sind keine Hilfsmittel erlaubt. Die Aufgaben können ohne Taschenrechner gelöst werden. Alle Lösungen sind auf den Prüfungsbogen zu schreiben. Bleistift erlaubt.

1. (a)  $A \cap B = \{1, 3, 4\}$  (b)  $A \cup B = \{0, 1, 2, 3, 4, 5, 6, 9\}$
2. (a)  $-31 - (-40) = 9$  (c)  $28 : (-7) + (-11) = -15$   
(b)  $13 + 7 \cdot 2 = 27$  (d)  $(-60) : (-5) \cdot (-2) = -24$
3. (a) 
$$\begin{array}{r} 60 = 2 \cdot 2 \cdot 3 \cdot 5 \\ 75 = \quad \quad 3 \cdot 5 \cdot 5 \\ \hline \text{ggT} = \quad \quad 3 \cdot 5 = 15 \end{array}$$
  
(b) 
$$\begin{array}{r} 8 = 2 \cdot 2 \cdot 2 \\ 12 = 2 \cdot 2 \cdot 3 \\ \hline \text{kgV} = 2 \cdot 2 \cdot 2 \cdot 3 = 24 \end{array}$$
4.  $260 = 2 \cdot 130 = 2 \cdot 2 \cdot 65 = 2 \cdot 2 \cdot 5 \cdot 13$
5. (a) Bruttopreis: 50 Franken, Rabatt: 30%; Nettopreis:  $50 \cdot \frac{70}{100} = 35.-$   
(b) Nettopreis: 32 Franken, Rabatt: 20%; Bruttopreis:  $32 \cdot \frac{100}{80} = 40.-$
6. (a)  $\frac{1}{3} + \frac{3}{4} = \frac{4+9}{12} = \frac{13}{12}$  (d)  $\frac{7}{2} \cdot \left(-\frac{3}{5}\right) = -\frac{21}{10}$   
(b)  $4 - \left(-\frac{2}{3}\right) = \frac{12}{3} + \frac{2}{3} = \frac{14}{3}$  (e)  $\frac{3}{4} : 2 = \frac{3}{8}$   
(c)  $5 \cdot \frac{2}{7} = \frac{10}{7}$  (f)  $\left(-\frac{4}{5}\right) : \left(-\frac{7}{3}\right) = \frac{4 \cdot 3}{5 \cdot 7} = \frac{12}{35}$
7. (a)  $-(-5)^2 + 5 = -25 + 5 = -20$  (c)  $-3^2 + 2^3 = -9 + 8 = -1$   
(b)  $(4 + 3 \cdot 2)^2 = 10^2 = 100$  (d)  $5^0 + (-1)^9 = 1 + (-1) = 0$
8. (a)  $\sqrt{169} - \sqrt{256} = 13 - 16 = -3$   
(b)  $\sqrt{2}\sqrt{8} = \sqrt{16} = 4$   
(c)  $\sqrt{21 \cdot 15 \cdot 35} = \sqrt{3 \cdot 7 \cdot 3 \cdot 5 \cdot 5 \cdot 7} = 3 \cdot 7 \cdot 5 = 105$   
(d)  $\sqrt{\sqrt{81}} = \sqrt{9} = 3$
9. (a)  $7x - (3 + 5x) = 7x - 3 - 5x = 2x - 3$   
(b)  $a^3b^2 - a(ab)^2 = a^3b^2 - a \cdot a^2b^2 = a^3b^2 - a^3b^2 = 0$   
(c)  $x^7y^3 : (x^5 : y) = x^7y^3 : x^5 \cdot y = x^2y^4$

10. (a)  $v + \frac{v}{u} = \frac{uv + v}{u}$   
 (b)  $\frac{x+a}{x} - \frac{x-a}{x} = \frac{x+a-x+a}{x} = \frac{2a}{x}$   
 (c)  $\left(\frac{4rs}{5t}\right)^2 = \frac{16r^2s^2}{25t^2}$   
 (d)  $\frac{5p}{2} : \frac{3}{7p} = \frac{5p \cdot 7p}{2 \cdot 3} = \frac{35p^2}{6}$

11. (a)  $\frac{6c^2d^3}{8c^3d^2} = \frac{3d}{4c}$   
 (b)  $\frac{x^2 - y^2}{x - y} = \frac{(x+y)(x-y)}{(x-y)} = x + y$   
 (c)  $\frac{4m - 2n}{4n - 8m} = \frac{2(2m - n)}{-4(2m - n)} = -\frac{1}{2}$   
 (d)  $\frac{\frac{a}{b}}{\frac{c}{a}} = \frac{a}{b} \cdot \frac{a}{c} = \frac{a^2}{bc}$

12. (a)  $4a^3b^2 + 10a^2b^2 = 2a^2b^2(2a + 5)$   
 (b)  $4p^2 - 12pq + 9q^2 = (2p - 3q)^2$   
 (c)  $z^2 - 5z - 36 = (z + 4)(z - 9)$

13. (a)  $(5a - 3b)(a + 2b) = 5a^2 + 7ab - 6b^2$   
 (b)  $(x^2 + y^2)^2 = x^4 + 2x^2y^2 + y^4$

14. (a)  $x + \frac{5}{2} = \frac{3x}{4} + 2$   
 $4x + 10 = 3x + 8$   
 $x = -2$

(b)  $6x - (7 - x) = 3(2x + 3)$   
 $6x - 7 + x = 6x + 9$   
 $x = 16$

$$15. \quad (a) \quad \frac{4+x}{x-2} = 6$$

$$4+x = 6x-12$$

$$16 = 5x$$

$$x = \frac{16}{5}$$

$$(b) \quad \frac{3}{x+1} = \frac{5}{2x-1}$$

$$3(2x-1) = 5(x+1)$$

$$6x-3 = 5x+5$$

$$x = 8$$

$$16. \quad (a) \quad \sqrt{1-x} = \sqrt{7-3x}$$

$$1-x = 7-3x$$

$$2x = 6$$

$$x = 3 \quad \text{Probe: } \sqrt{-2} = \sqrt{-2}$$

$$L = \{ \}$$

$$(b) \quad 3\sqrt{x} = \sqrt{x} + 10$$

$$2\sqrt{x} = 10$$

$$\sqrt{x} = 5$$

$$x = 25 \quad \text{Probe: } 15 = 15$$

$$L = \{25\}$$

$$17. \quad f(x) = \frac{x-5}{x-1}$$

$$f(0) = \frac{-5}{-1} = 5; \quad f(1) = \frac{-4}{0} \text{ nicht definiert}; \quad f(2) = \frac{-3}{1} = -3$$

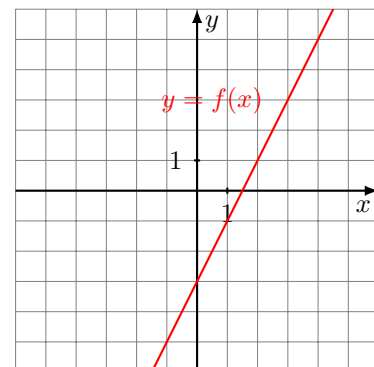
$$0 = \frac{x-5}{x-1} \Rightarrow x = 5$$

$$18. \quad \text{Gegeben: } f(x) = 2x - 3$$

(a) Skizze: siehe rechts

(b) Ordinatenabschnitt:  $f(0) = 2 \cdot 0 - 3 = -3$

(c) Nullstelle:  $2x - 3 = 0 \Rightarrow x = 1.5$

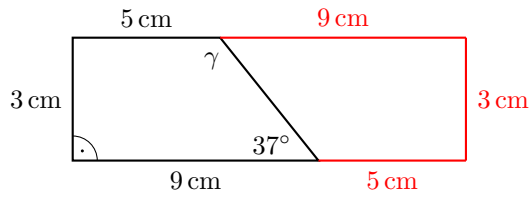


$$19. \quad (a) \quad 17.32 \text{ m} = 173.2 \text{ dm} = 1732 \text{ cm} = 17320 \text{ mm}$$

$$(b) \quad 100\,000 \text{ m}^2 = 1000 \text{ a} = 10 \text{ ha} \quad (1 \text{ a} = 100 \text{ m}^2, 1 \text{ ha} = 100 \text{ a})$$

$$(c) \quad 0.1 \text{ m}^3 = 100 \text{ dm}^3 = 100 \ell$$

20. Verdoppeln der Figur ergibt ein Rechteck mit der Breite 14 cm und der Höhe 3 cm.



Also:  $A = \frac{14 \cdot 3}{2} = 7 \cdot 3 = 21 \text{ cm}^2$

Natürlich lässt sich die Aufgabe auch mit der Trapezformel lösen:

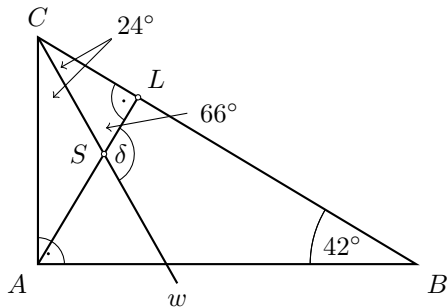
$$m = (a + b)/2 = (9 + 5)/2 = 7 \text{ cm} \Rightarrow A = m \cdot h = 7 \cdot 3 = 21 \text{ cm}^2$$

$$\gamma = 180^\circ - 37^\circ = 143^\circ$$

21.  $A = r^2\pi = 49\pi \text{ cm}^2 \Rightarrow r = 7 \text{ cm}$

$$u = 2\pi r = 14\pi \text{ cm}$$

22.



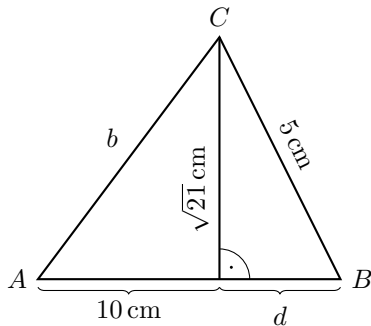
$$\sphericalangle(ACB) = 180^\circ - 90^\circ - 42^\circ = 48^\circ$$

$$\sphericalangle(SCL) = 48^\circ/2 = 24^\circ$$

$$\sphericalangle(LSC) = 180^\circ - 90^\circ - 24^\circ = 66^\circ$$

$$\delta = 180^\circ - 66^\circ = 114^\circ$$

23.

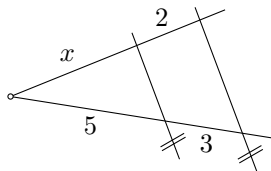


$$b = \sqrt{21 + 100} = \sqrt{121} = 11 \text{ cm}$$

$$d = \sqrt{25 - 21} = \sqrt{4} = 2 \text{ cm}$$

$$u = 10 + 2 + 5 + 11 = 28 \text{ cm}$$

24. (a)

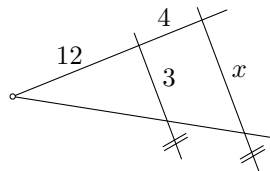


$$x : 2 = 5 : 3$$

$$3x = 10$$

$$x = \frac{10}{3}$$

(b)

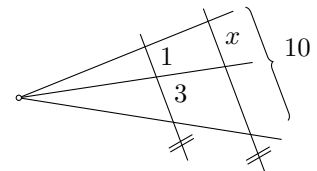


$$12 : 3 = (12 + 4) : x$$

$$12x = 48$$

$$x = 4$$

(c)



$$1 : (1 + 3) = x : 10$$

$$4x = 10$$

$$x = \frac{5}{2}$$