

Wiskunde voor vrijescholen

Antwoorden Klas 9

B.Geels

17 augustus 2024

Ongelijkheden

1-1 a. $[-3, -1]$ b. $\langle 0, 1 \rangle$ c. $\langle 2, 4 \rangle$ d. $[5, 7]$

1-2 ~~$-5 -4 -3 -2 -1 0 1 2 3 4 5 6 7$~~

1-3 ~~$-5 -4 -3 -2 -1 0 1 2 3 4 5 6 7$~~

1-4 c. $\{-2, -1, 0, 1, 2, 3\}$ d. $\{-1, 0, 1, 2, 3\}$

1-5 b. $\{0, 1, 2, 3, 4\}$; c. $\{-1, 0, 1, 2, 3, 4\}$ d. $\{-1\frac{1}{2}, \frac{2}{3}, 3\frac{1}{3}\}$

1-6	a. $\{-1, 0, 1\}$	c. geen	e. $\{-5, -4, -3, -2\}$
	b. $\{7\}$	d. $\{-1, 0\}$	f. $\{6, 7, 8, 9, 10\}$

1-7 $[70, 120]$

1-8 $[90, 110]$

1-9 a. $\{0, 1, 2, 3\}$ | b. $\{-2, -1, 0, 1, 2, 3\}$ | c. $\{1\frac{1}{2}, -\frac{1}{3}, 2\frac{3}{4}\}$

1-10 ~~$-5 -4 -3 -2 -1 0 1 2 3 4 5 6 7$~~

1-11 ~~$-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4$~~

1-12	a. $[1, 4]$	c. $\langle 0, 4 \rangle$	e. $[-\frac{1}{3}, 1\frac{1}{2}]$
	b. $[-1, 2]$	d. $\langle 0, 3 \rangle$	f. $[1, 2]$

1-13	a. $[2, 3\frac{1}{3}]$	c. $\langle 3, 5 \rangle$	e. $\emptyset$
	b. $[-\frac{1}{2}, \frac{1}{2}]$	d. $\emptyset$	f. $\langle 1, \rightarrow \rangle$

1-14 a. ja, A c. tussen 11 en 13 zijn A en B beide open.
d. $[12, 13]$ e. $[9, 11]$ en $\langle 15, 17]$

1-15 a. $[3, 8]$ b. $[10, 13]$ c. na dag 21, $[21, \rightarrow)$

1-16 a. 48 km/uur b. $\langle 48, 97]$ c. $\langle 72, 112]$

1-17	a. $\langle -2, 4 \rangle$	c. $\langle \leftarrow, 3 \rangle$
	b. $\mathbb{R}$	d. $[-1, \rightarrow)$

1-18	a. $[1, 2]$	c. $\langle 0, 1 \rangle$	e. $\emptyset$
	b. kan niet korter	d. $\{1\}$	f. $\langle \leftarrow, 3 \rangle$

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|---|---|--|--|---|--|--|
| 1-19 | a. $[3\frac{1}{7}, 3\frac{1}{6}]$
b. $\emptyset$ | c. $\emptyset$
d. $\langle -1\frac{6}{7}, -1\frac{5}{6} \rangle$ | | | | |
| 1-20 | a. $\{3\}$
b. k.n.k of: $[1, 5] \setminus \{3\}$ | c. $[1, 5]$
d. $[4, 5]$
e. $\emptyset$
f. $[-1, \rightarrow)$ | | | | |
| 1-21 | <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; vertical-align: top; padding-right: 10px;"> a. $x \leq 2; x \in \langle \leftarrow, 2]$
 b. $x > 0; x \in \langle 0 \rightarrow)$ </td> <td style="width: 25%; vertical-align: top; padding-right: 10px;"> c. $x \leq 4; x \in \langle \leftarrow, 4]$
 d. $x > 6; x \in \langle 6 \rightarrow)$ </td> <td style="width: 25%; vertical-align: top; padding-right: 10px;"> e. $x > 4; x \in \langle 4 \rightarrow)$
 f. $x < 4; x \in \langle \leftarrow, 4)$ </td> <td style="width: 25%; vertical-align: top;"> g. $x \leq 0; x \in \langle \leftarrow, 0]$
 h. $x \leq 5; x \in \langle \leftarrow, 5]$ </td> </tr> </table> | | a. $x \leq 2; x \in \langle \leftarrow, 2]$
b. $x > 0; x \in \langle 0 \rightarrow)$ | c. $x \leq 4; x \in \langle \leftarrow, 4]$
d. $x > 6; x \in \langle 6 \rightarrow)$ | e. $x > 4; x \in \langle 4 \rightarrow)$
f. $x < 4; x \in \langle \leftarrow, 4)$ | g. $x \leq 0; x \in \langle \leftarrow, 0]$
h. $x \leq 5; x \in \langle \leftarrow, 5]$ |
| a. $x \leq 2; x \in \langle \leftarrow, 2]$
b. $x > 0; x \in \langle 0 \rightarrow)$ | c. $x \leq 4; x \in \langle \leftarrow, 4]$
d. $x > 6; x \in \langle 6 \rightarrow)$ | e. $x > 4; x \in \langle 4 \rightarrow)$
f. $x < 4; x \in \langle \leftarrow, 4)$ | g. $x \leq 0; x \in \langle \leftarrow, 0]$
h. $x \leq 5; x \in \langle \leftarrow, 5]$ | | | |
| 1-22 | a. $x < 1; x \in \langle \leftarrow, 1)$
b. $x \leq 6; x \in \langle \leftarrow, 6]$ | c. $x < -2; x \in \langle \leftarrow, -2)$
d. $x < 16; x \in \langle \leftarrow, 16)$
e. $x \geq 4; [4, \rightarrow)$
f. $x > 7; x \in \langle 7 \rightarrow)$ | | | | |
| 1-23 | a. $x < 8; x \in \langle \leftarrow, 8)$
b. $x > 3; x \in \langle 3 \rightarrow)$ | c. $x < 0; x \in \langle \leftarrow, 0)$
d. $x > -6; x \in \langle -6 \rightarrow)$
e. $x > -5; x \in \langle -5 \rightarrow)$
f. $x > -9; x \in \langle -9 \rightarrow)$ | | | | |
| 1-24 | a. $x \geq 2; [2, \rightarrow)$
b. $x \geq 3; [3, \rightarrow)$ | c. $x \leq -2; x \in \langle \leftarrow, -2]$
d. $x < -4\frac{1}{2}$
e. $x > 3; x \in \langle 3 \rightarrow)$
f. $x < 4\frac{1}{2}$ | | | | |
| 1-25 | a. $x \geq 2; [2, \rightarrow)$
b. $x \geq 0; [0, \rightarrow)$ | c. $x \leq 2; x \in \langle \leftarrow, 2]$
d. $x \leq 3; x \in \langle \leftarrow, 3]$
e. $x \leq 0; x \in \langle \leftarrow, 0]$
f. $x \leq 3\frac{1}{4}; x \in \langle \leftarrow, 3\frac{1}{4}]$ | | | | |
| 1-26 | a. $x > 2; x \in \langle 2 \rightarrow)$
b. $x < 7; x \in \langle \leftarrow, 7)$ | c. $x > 5; x \in \langle 5 \rightarrow)$
d. $x > -3; x \in \langle -3 \rightarrow)$
e. $x < -4; x \in \langle \leftarrow, -4)$
f. $x > -3; x \in \langle -3 \rightarrow)$ | | | | |
| 1-27 | a. $x > -\frac{5}{2}; x \in \langle -\frac{5}{2} \rightarrow)$
b. $x < \frac{25}{2}; x \in \langle \leftarrow, \frac{25}{2})$ | c. $x > 0; x \in \langle 0 \rightarrow)$
d. $x \leq 4; x \in \langle \leftarrow, 4]$
e. $x \in \mathbb{R}$
f. $x \in \mathbb{R}$ | | | | |

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|---|--|--|
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">1-28</div> <p>a. $x \in \emptyset$</p> <p>b. $x < -2$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">c.</div> <p>$x \geq -\frac{3}{2}$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">d.</div> <p>$x \leq \frac{4}{3}; \quad x \in \langle \leftarrow, \frac{4}{3} \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">e.</div> <p>$x \leq -\frac{5}{3}$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">f.</div> <p>voor elke $x; \quad x \in \mathbb{R}$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">1-29</div> <p>a. $x < -6; \quad x \in \langle \leftarrow, -6 \rangle$</p> <p>b. $x > 9; \quad x \in \langle 9, \rightarrow \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">c.</div> <p>$x \geq -\frac{8}{3}; \quad [-\frac{8}{3}, \rightarrow \rangle$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">d.</div> <p>$x > \frac{11}{2}; \quad x \in \langle \frac{11}{2}, \rightarrow \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">e.</div> <p>$x \leq 0; \quad x \in \langle \leftarrow, 0 \rangle$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">f.</div> <p>$x < -\frac{11}{2}; \quad x \in \langle \leftarrow, -\frac{11}{2} \rangle$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">1-30</div> <p>a. $x > 12; \quad x \in \langle 12, \rightarrow \rangle$</p> <p>b. $x < \frac{3}{2}; \quad x \in \langle \leftarrow, \frac{3}{2} \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">c.</div> <p>$x < -\frac{69}{2}; \quad x \in \langle \leftarrow, -\frac{69}{2} \rangle$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">d.</div> <p>$x < 0; \quad x \in \langle \leftarrow, 0 \rangle$</p> | |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">1-31</div> <p>a. $x < 7; \quad x \in \langle \leftarrow, 7 \rangle$</p> <p>b. $x < \frac{5}{2}; \quad x \in \langle \leftarrow, \frac{5}{2} \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">c.</div> <p>$x < 2; \quad x \in \langle \leftarrow, 2 \rangle$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">d.</div> <p>$x > 1; \quad x \in \langle 1, \rightarrow \rangle$</p> | |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">1-32</div> <p>a. $x > 6; \quad x \in \langle 6, \rightarrow \rangle$</p> <p>b. $x < -\frac{5}{2}; \quad x \in \langle \leftarrow, -\frac{5}{2} \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">c.</div> <p>$x > \frac{3}{2}; \quad x \in \langle \frac{3}{2}, \rightarrow \rangle$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">d.</div> <p>$x > -\frac{1}{2}; \quad x \in \langle -\frac{1}{2}, \rightarrow \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">e.</div> <p>$x > -5; \quad x \in \langle -5, \rightarrow \rangle$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">f.</div> <p>$x < -\frac{3}{2}; \quad x \in \langle \leftarrow, -\frac{3}{2} \rangle$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">1-33</div> <p>a. $x \leq 5$</p> <p>b. $x \leq 5$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">c.</div> <p>$x \geq 4$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">d.</div> <p>$x < \frac{5}{2}; \quad x \in \langle \leftarrow, \frac{5}{2} \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">e.</div> <p>$x \geq -3$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">f.</div> <p>$x > -4; \quad x \in \langle -4, \rightarrow \rangle$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">1-34</div> <p>a. $x < 3; \quad x \in \langle \leftarrow, 3 \rangle$</p> <p>b. $x \leq -\frac{11}{2}; \quad x \in \langle \leftarrow, -\frac{11}{2} \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">c.</div> <p>$x \leq 3; \quad x \in \langle \leftarrow, 3 \rangle$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">d.</div> <p>$x \leq -6; \quad x \in \langle \leftarrow, -6 \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">e.</div> <p>$x \geq 2; \quad [2, \rightarrow \rangle$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">f.</div> <p>$x \geq \frac{2}{3}; \quad [\frac{2}{3}, \rightarrow \rangle$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">1-35</div> <p>a. $x \geq 0$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">b.</div> <p>$x \leq 5$</p> | |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">1-36</div> <p>a. $x \geq -2$</p> <p>b. $x \in \mathbb{R}$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">c.</div> <p>$a \leq 4$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">d.</div> <p>$p \leq 4$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">e.</div> <p>$z \leq \frac{5}{3}$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">f.</div> <p>$k \geq -\frac{10}{3}$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">1-37</div> <p>a. $x < -2\frac{1}{2}; \quad x \in \langle \leftarrow, -2\frac{1}{2} \rangle$</p> <p>b. $x \geq 9; \quad x \in [9, \rightarrow \rangle$</p> <p>c. $x \leq -2\frac{2}{5}; \quad x \in \langle \leftarrow, -2\frac{2}{5} \rangle$</p> | <div style="border: 1px solid black; padding: 2px; display: inline-block;">d.</div> <p>$x \geq -6\frac{1}{4}; \quad x \in [-6\frac{1}{4}, \rightarrow \rangle$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">e.</div> <p>$x \leq -6; \quad x \in \langle \leftarrow, -6 \rangle$</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">f.</div> <p>alle x</p> | |

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|-------------|--|---|
| 1-38 | a. $4 < x < 6$
b. k.n. | c. k.n.
d. $-2 < x < 3$ |
| 1-39 | a. $x \in \langle 3, 7 \rangle$
b. $x \in [4, \rightarrow)$ | c. $x \in \mathbb{R}$
d. $x \in \langle 3, \rightarrow \rangle$ |
| 1-40 | a. $x \in \langle \leftarrow, -1 \rangle$
b. $x \in \emptyset$ | c. $x \in \mathbb{R}$
d. $x \in \langle \leftarrow, -1 \rangle \cup \langle 2, \rightarrow \rangle$ |
| 1-41 | a. $x \in \langle 0, 3 \rangle$ b. $x \in \langle \leftarrow, 7 \rangle$ c. $x \in \langle -3, \rightarrow \rangle$ d. $x \in \langle -1, 0 \rangle$ | |
| 1-42 | a. $x \in \langle 3, 5 \rangle$
b. $x \in [-5, -1)$ | c. $x \in [0, 1)$
d. $x \in [-1\frac{1}{2}, -\frac{1}{2}]$ |
| 1-43 | a. $x \in \langle \leftarrow, 1 \rangle$ b. $x \in \emptyset$ c. $x \in \langle 1\frac{1}{2}, 3\frac{1}{2} \rangle$ | |
| 1-44 | a. $x \in \langle 3, \rightarrow \rangle$ b. $x \in \langle 3, \rightarrow \rangle$ c. $x \in \langle -4, -\frac{3}{2} \rangle$ | |
| 1-45 | a. $x \in \emptyset$
b. $x \in \mathbb{R}$ | c. $x \in \mathbb{R}$
d. $x \in \emptyset$ |
| 1-46 | a. $x < -4 \vee x > 4$
b. $x \leq -3 \vee x \geq 3$ | c. $-6 < x < 6$
d. $\emptyset$ |
| 1-47 | a. $-10 < x < 10$
b. $x \leq -3 \vee x \geq 3$ | e. $-2 \leq x \leq 2$
f. $\mathbb{R}$ |
| 1-48 | a. $\emptyset$
b. $x \neq 0$ | c. $x = 0$
d. $x \in \langle \leftarrow, -1\frac{2}{5} \rangle \cup \langle 4\frac{1}{5}, \rightarrow \rangle$ |
| 1-49 | a. $x \in \langle \leftarrow, -\frac{5}{12} \rangle \cup \langle -1\frac{1}{4}, \rightarrow \rangle$
b. $x \in \langle -1\frac{1}{2}, 4\frac{1}{2} \rangle$ | c. $x \in [-12, 20]$
d. $x \in \langle \leftarrow, -3 \rangle \cup [-\frac{1}{3}, \rightarrow)$ |
| 1-50 | a. $x \in [-6, 10]$
b. $x \in \mathbb{R}$ | e. $x \in \langle \leftarrow, 2\frac{1}{2} \rangle \cup \langle 4\frac{1}{2}, \rightarrow \rangle$
f. $x \in \langle -\frac{12}{13}, \frac{2}{13} \rangle$ |
| | | c. $x \in \langle \leftarrow, -7 \rangle \cup [11, \rightarrow)$
d. $x \in \langle 1\frac{1}{2}, 6\frac{1}{2} \rangle$ |

1-51	a. $\langle -3, 3 \rangle$ b. $[-10, 10]$	c. $\langle \leftarrow, -5 \rangle \cup [5, \rightarrow)$ d. $\langle \leftarrow, -4 \rangle \cup \langle 4, \rightarrow \rangle$	e. $\langle -1, 1 \rangle$ f. $[-3, 3]$
1-52	a. $\mathbb{R}$ b. $\emptyset$	c. $\emptyset$ d. $\mathbb{R}$	e. $\mathbb{R}$ f. $[-2, 2]$
1-53	a. $\emptyset$ b. $x = 0$	c. $\mathbb{R}$ d. $x < 0 \vee x > 6, x \in \langle \leftarrow, 0 \rangle \cup \langle 6, \rightarrow \rangle$	e. $x \neq 0$ f. $1 \leq x \leq 5, x \in [1, 5]$
1-54	a. $x \in \emptyset$ b. $x \neq 6, x \in \langle \leftarrow, 6 \rangle \cup \langle 6, \rightarrow \rangle, x \in \mathbb{R} \setminus \{6\}$	c. $-1 < x < 7, x \in \langle -1, 7 \rangle$ d. $x \in \emptyset$	

Irrationale getallen

2-1	a. 4 b. 0,7	c. 10 d. 0,8	e. 12 f. $\frac{1}{2}$	g. 13 h. $\frac{2}{3}$
2-2	a. $4 + 3 = 7$ b. $13 - 12 = 1$	c. $5 - 2 = 3$ d. $10 - 11 = -1$		
2-3	a. -2 b. 10	c. -9 d. 1	e. 10 f. 4	
2-4	a. 6 b. 4	c. -2 d. 0		
2-5	a. 5 b. 5	c. 7 d. 20	e. 6 f. 10	
2-6	a. 2 b. 6	c. k.n. d. -6	e. 0 f. 1	g. k.n. h. -1
2-7	a. -3 b. -2	c. k.n. d. 10	e. 2 f. -10	

2-8	a. $\frac{2}{3}$ b. $\frac{9}{2}$	c. $\frac{1}{6}$ d. $\frac{5}{4}$	e. k.n. f. $\frac{8}{9}$	g. $-\frac{1}{2}$ h. $\frac{7}{5}$
2-9	a. $\frac{3}{2}$ b. $\frac{6}{5}$	c. $\frac{5}{2}$ d. $\frac{10}{3}$	e. $\frac{4}{3}$ f. $\frac{9}{2}$	g. $\frac{7}{3}$ h. $\frac{7}{4}$
2-10	a. $\frac{2}{5}$ b. $\frac{1}{4}$		c. $\frac{3}{2}$ d. $\frac{1}{2}$	
2-11	a. 144 b. 0,01	c. 1,44 d. 0,49	e. 441 f. 0,04	g. 4,41 h. 6,25
2-12	a. 11 b. 0,9	c. 1,1 d. 0,7	e. 1,3 f. 0,3	g. 0,6 h. 0,1
2-13	a. 0,1 b. 0,2		c. 0,2 d. -0,3	
2-14	a. 21 b. 0	c. -20 d. -1	e. 3 f. 8	g. 5 h. -5
2-15	a. 23 b. $19\frac{1}{3}$		c. 6 d. -69	
2-16	a. 17 b. 22		c. -6 d. 0	
2-17	a. $9\sqrt{3}$ b. $-\sqrt{11}$	c. $5\sqrt{5}$ d. $\sqrt{2}$	e. $-6\sqrt{13}$ f. $-16\sqrt{6}$	
2-18	a. $8\sqrt{3}$ b. 0	c. $7\sqrt{3}$ d. 12	e. $2\sqrt{7}$ f. k.n.	
2-19	a. $-4\sqrt{2}$ b. 0 c. $\frac{1}{2}\sqrt{5}$		d. -40 e. k.n. f. $1\frac{1}{6}\sqrt{5}$	

2-20	a. $5\sqrt{2} + 11\sqrt{3}$ b. $-5\sqrt{2} - 3\sqrt{5}$ c. $-\sqrt{2} - \sqrt{5}$	d. $3\sqrt{6} + 7\sqrt{10}$ e. $2\sqrt{2} + \sqrt{3}$ f. $2\sqrt{5} + 2\sqrt{3}$
2-21	a. 5 b. 14	c. 4 d. $3 + 3\sqrt{3}$
2-22	a. $5 + 6\sqrt{2}$ b. $\frac{3}{4}\sqrt{2} - \frac{4}{5}\sqrt{6}$ c. $2\sqrt{5} - 2\sqrt{3} + \sqrt[3]{5}$	d. $\sqrt{7} + \frac{2}{3}\sqrt{5}$ e. $-\frac{1}{4}\sqrt{2}$ f. $3\sqrt{7} + \sqrt[3]{10} + 2\sqrt{2}$
2-23	a. $14\sqrt{3}$ b. $10\sqrt{3} + 15\sqrt{7}$	c. $31\sqrt{7}$ d. $6\sqrt{3} - 3\sqrt{2}$
2-24	a. $6\sqrt{5} + 9\sqrt{2}$ b. $9\sqrt{3} - 3\sqrt{7}$	c. $4\sqrt{5} - 7\sqrt{2}$ d. $-22\sqrt{6} + 24\sqrt{3}$
2-25	a. $\sqrt{6}$ b. $15\sqrt{56}$ (of: $30\sqrt{14}$)	c. $\sqrt{10}$ d. 6 e. $6\sqrt{12}$ (of: $12\sqrt{3}$) f. $10\sqrt{80}$ (of: $40\sqrt{5}$)
2-26	a. 90 b. $15\sqrt{abc}$	c. $2\sqrt{14}$ d. $8\sqrt{a^2b}$ (of: $8a\sqrt{b}$) e. $6\sqrt{ab}$ f. $6\sqrt{\frac{ac}{b}}$
2-27	a. 11 b. 10	c. 4 d. k.n. e. 4 f. $3\sqrt{5}$
2-28	a. $\sqrt{6}$ b. $\sqrt{6}$	c. k.n. d. 1 e. $3\sqrt{42}$ f. 12
2-29	a. $2\sqrt{6} + 2\sqrt{3}$ b. $\sqrt{ab}$	c. $2 - \sqrt{5}$ d. $\sqrt{a^2b}$ (of: $a\sqrt{b}$) e. 16 f. $7\sqrt{a}$
2-30	a. 80 b. $\sqrt{18}$ (of: $3\sqrt{2}$)	c. -32 d. 20 e. 18 f. 10

2-31	a. $\sqrt{2}$ b. 1	c. $\sqrt{3}$ d. $28\sqrt{15}$	e. 4 f. $40\sqrt{55}$
2-32	a. $2\sqrt{5}$ b. 3	c. $\frac{1}{2}\sqrt{3}$ d. 2	e. $\sqrt{7}$ f. 10
2-33	a. $4\sqrt{3}$ b. $\frac{1}{8}\sqrt{15}$	c. $1\frac{1}{2}\sqrt{10}$ d. $2\sqrt{7}$	e. $\frac{1}{2}\sqrt{2}$ f. $\frac{16}{5}$
2-34	a. $12 + 6\sqrt{3} + 2\sqrt{5} + \sqrt{15}$ b. $-3 - \sqrt{5}$	c. $7\sqrt{2} - 2 - 7\sqrt{5} + \sqrt{10}$ d. $2\sqrt{6} + 3\sqrt{3}$	
2-35	a. -1 b. $38 - 12\sqrt{10}$	c. 1 d. $21 + 8\sqrt{5}$	
2-36	a. $18 + 6\sqrt{5} + 3\sqrt{2} + \sqrt{10}$ b. $\sqrt{30} - 6\sqrt{10} - 2\sqrt{3} + 12$ c. $57 - 12\sqrt{15}$	d. $15 - 5\sqrt{2} + 6\sqrt{3} - 2\sqrt{6}$ e. $2\sqrt{10} + 2\sqrt{2} + 30 + 6\sqrt{5}$ f. $18 + 4\sqrt{18}$ (of: $18 + 12\sqrt{2}$)	
2-37	a. 6 b. α^2	c. $9\sqrt[3]{3}$ d. $4x^4\sqrt{x}$	
2-38	a. 6 b. $-3\sqrt{2}$	c. $3\sqrt{3} + 2\sqrt{2}$ d. $-\sqrt{6} + 3$	
2-39	a. 7 b. $-\sqrt{10} - \frac{1}{9}$	c. $-3\sqrt{10}$ d. $\frac{2}{3}\sqrt{5}$	
2-40	a. $2\sqrt{2}$ b. $-2\sqrt{6}$	c. $-5\frac{7}{8}$ d. $-12\sqrt{2}$	
2-41	a. 6 b. 6	c. 6 d. 6	
2-42	a. $2\sqrt{5}$ b. $2\sqrt{7}$	c. $2\sqrt{6}$ d. $3\sqrt{3}$	e. $4\sqrt{2}$ f. $3\sqrt{2}$

2-43	a. $2\sqrt{3}$ b. $5\sqrt{6}$	c. $10\sqrt{2}$ d. $4\sqrt{3}$	e. $2\sqrt{15}$ f. $2\sqrt{110}$
2-44	a. $6\sqrt{2}$ b. $3\sqrt{2}$	c. $22\frac{1}{2}$ d. $\frac{5}{12}$	e. $-2\sqrt{3}$ f. 0
2-45	a. -11 b. $13\frac{1}{2}\sqrt{7}$ c. 0		d. $-12\sqrt{2}$ e. $-25\sqrt{10}$ f. $\frac{1}{3}\sqrt{5}$
2-46	a. -4 b. $8\sqrt{11}$ c. 30		d. $-23\sqrt{6}$ e. $2\sqrt{6}$ f. $-3\sqrt{10}$
2-47	a. $2\sqrt{10}$ b. $3\sqrt{5}$ c. $\sqrt{3}$ d. $6\sqrt{6}$		e. $12\sqrt{2}$ f. $3\sqrt{6}$ g. 6 h. $6\sqrt{3}$
2-48	a. $10\sqrt{6}$ b. $12\sqrt{15}$	c. $6\sqrt{70}$ d. $30\sqrt{14}$	e. $2\sqrt{155}$ f. $36\sqrt{14}$
2-49	a. $6\sqrt[3]{7}$ b. $10\sqrt{1814}$	c. $6\sqrt[4]{24}$ d. $35\sqrt{2}$	e. $3\sqrt[3]{210}$ f. $30\sqrt{5}$
2-50	a. $6\sqrt[3]{30}$ b. $10\sqrt[4]{54}$	c. 6 d. $4\sqrt{95}$	e. $6\sqrt[3]{21}$ f. $6\sqrt{141}$
2-51	a. $a\sqrt[3]{a^2}$ b. $a\sqrt[3]{a^2b}$	c. $a\sqrt[4]{ab}$ d. $a^2\sqrt[3]{b}$	e. $a\sqrt[3]{a^2b^2}$ f. $a^2\sqrt{ab}$
2-52	a. $ab\sqrt[3]{a^2b^2}$ b. $a^2\sqrt{b}$	c. $ab\sqrt{a}$ d. $a^2b\sqrt[4]{b}$	e. $ab\sqrt[3]{a^2}$ f. $ab\sqrt[3]{a^2}$

2-53	a. $\sqrt{a}$ b. $\frac{b^3}{a}\sqrt{a}$	c. $ab^2\sqrt{b}$ d. $\frac{b}{a}$	e. $a\sqrt[3]{b^2}$ f. $\frac{a}{b}\sqrt{a}$	g. $b\sqrt[4]{a^3}$ h. $\frac{1}{ab}\sqrt{a}$
2-54	a. $\frac{2}{3}$ b. $\frac{3}{4}\sqrt{3}$	c. $\frac{1}{3}\sqrt{5}$ d. $\frac{1}{5}\sqrt{10}$	e. $\frac{1}{4}\sqrt{7}$ f. $\frac{1}{7}\sqrt{7}$	
2-55	a. $\frac{2}{3}\sqrt{6}$ b. $\frac{1}{6}\sqrt{30}$	c. $\frac{1}{10}\sqrt{410}$ d. $\frac{3}{5}\sqrt{5}$	e. $\frac{1}{4}\sqrt{5}$ f. $\frac{7}{3}\sqrt{3}$	
2-56	a. $2\frac{1}{2}\sqrt{2}$ b. $\frac{8}{3}\sqrt{3}$	c. $\frac{5}{7}\sqrt{7}$ d. $\frac{1}{2}$	e. $\sqrt{2}$ f. $\frac{3}{4}$	
2-57	a. $\frac{1}{3}\sqrt{3}$ b. $\frac{5}{6}$	c. $\frac{1}{7}\sqrt{7}$ d. $\sqrt{3}$	e. $\frac{4}{5}$ f. $2\sqrt{10}$	
2-58	a. $\frac{2}{10}\sqrt{10} = \frac{1}{5}\sqrt{10}$ b. $\frac{1}{6}\sqrt{3}$	c. $\sqrt{5}$ d. $\frac{1}{2}\sqrt{6}$	e. $\frac{1}{5}\sqrt{5}$ f. $\frac{1}{2}\sqrt{7}$	
2-59	a. $\frac{1}{2}\sqrt{14}$ b. $\frac{1}{4}\sqrt{14}$	c. $\frac{1}{4}\sqrt{10}$ d. $\frac{1}{10}\sqrt{30}$	e. $\frac{1}{6}\sqrt{6}$ f. $\frac{2}{15}\sqrt{15}$	
2-60	a. $\frac{1}{8}\sqrt{2}$ b. $-1\frac{1}{2}\sqrt{2}$	c. $-6\sqrt{7}$ d. $4\frac{1}{3}\sqrt{6}$	e. $-3\sqrt{13}$ f. $1\frac{1}{2}\sqrt{2}$	
2-61	a. $-\frac{2}{9}$ b. 1,7 c. $110\frac{1}{4}$		d. $1\frac{1}{4}$ e. 1,1 f. $\frac{1}{6}$	
2-62	a. $\frac{5}{3}(2\sqrt{2} + \sqrt{5})$ b. $\frac{5\sqrt{a} + 5\sqrt{b}}{a - b}$	c. $\frac{2\sqrt{10} - \sqrt{15}}{5}$ d. $-6(\sqrt{2} + \sqrt{3})$	e. $-\frac{9 + 2\sqrt{14}}{5}$ f. $\frac{50 + 5\sqrt{3}}{97}$	

2-63	a. $2+6\sqrt{2}+6\sqrt{3}+\sqrt{6}$	c. $21\frac{1}{2}-4\frac{1}{2}\sqrt{15}$	e. $\frac{3}{7}\sqrt{6}+\frac{12}{7}\sqrt{3}$
	b. $7-3\sqrt{5}$	d. $2+\sqrt{3}$	f. $3\sqrt{2}-2\sqrt{3}$

2-64	a. $3\sqrt{3}$	c. $7\sqrt[3]{7}$	e. $\sqrt[3]{25}$
	b. $2\sqrt[4]{4}$	d. 17	f. 125

2-65	a. a^2b	c. 81	e. $10\sqrt[5]{100}$
	b. $a^2b^2\sqrt[3]{a^2}$	d. $a^3b\sqrt{b}$	f. 50

2-66	a. $\sqrt[20]{a}$	c. $\sqrt{2}\sqrt[4]{5}$
	b. $\frac{2}{5}\sqrt[4]{6}\sqrt{5}$	d. $3\sqrt[6]{10}\sqrt[3]{a^2}$

2-67

 $a = \sqrt{45} = 3\sqrt{5}, \quad b = \sqrt{90} = 3\sqrt{10}, \quad c = \sqrt{180} = 6\sqrt{5} \text{ en}$
 $d = \sqrt{60} = 2\sqrt{15}$

$$\boxed{2-68} \quad a = 3, \quad b = 20 - \sqrt{105}$$

$$\boxed{2-69} \quad a = \sqrt{51}; b = \sqrt{21}$$

$$\boxed{2-70} \quad a = \sqrt{113}; b = 6$$

$$\boxed{2-71} \quad a = 60; b = 10\sqrt{5}; c = 2; d = \sqrt{89}$$

$$\boxed{2-72} \quad a = 8; b = 15; c = 3; d = 3\sqrt{2}$$

$$\boxed{2-73} \quad a = 9; b = 2; c = 7; d = 25$$

$$\boxed{2-74} \quad a = 16; b = 2\frac{6}{7}; c = \sqrt{3}; d = \frac{1}{5}\sqrt{365}$$

$$\boxed{2-75} \quad a = 1; b = 2\sqrt{11}; c = 3; d = 5$$

$$\boxed{2-76} \quad a = \frac{2}{3}\sqrt{7}; b = 12; c = 18; d = 2\sqrt{30}$$

$$\boxed{2-77} \quad a = 4\sqrt{15}; b = 6; c = 2\sqrt{10}; d = 2\sqrt{14}$$

$$\boxed{2-78} \quad a = \frac{3}{7}; b = \sqrt{23}; c = 20; d = 11$$

$$\boxed{2-79} \quad a = 8; b = 6; c = 9; d = 20$$

$$\boxed{2-80} \quad a = 3\sqrt{13}; b = \sqrt{139}$$

$$\boxed{2-81} \quad a = 2\sqrt{5}; b = \sqrt{3}$$

$$\boxed{2-82} \quad a = \frac{8}{13}\sqrt{13}; b = \frac{4}{3}\sqrt{3}$$

$$\boxed{2-83} \quad \text{a. } \frac{5}{6}\sqrt{6}$$

$$\text{b. } 2\sqrt{3} - 1$$

$$\text{c. } 19 + 12\sqrt{2} + 6\sqrt{3} + 5\sqrt{6}$$

$$\text{d. } 10 + 2\sqrt{6} + 2\sqrt{10} + 2\sqrt{15}$$

$$\boxed{2-84} \quad \text{a. } a^2 + 2a\sqrt{b} + b$$

$$\text{b. } x^2 - 2x\sqrt{y} + y$$

$$\text{c. } b^2 + 2ab\sqrt{b} + a^2b$$

$$\text{d. } b^2 - bc$$

$$\boxed{2-85} \quad \text{a. } 2\sqrt{6}$$

$$\text{b. } x - 2x\sqrt{2}$$

$$\text{c. } 1 + 3\sqrt{3}$$

$$\text{d. } 11\sqrt{2} + 9\sqrt{3}$$

$$\boxed{2-86} \quad \text{a. } a\sqrt{a} + 6a\sqrt{b} + 12b\sqrt{a} + 8b\sqrt{b}$$

$$\text{b. } 24 + 7\sqrt{6}$$

$$\text{c. } 2y$$

$$\boxed{2-87} \quad \text{a. } 3\sqrt{7} + 5$$

$$\text{b. } 25$$

$$\text{c. } 3\sqrt{2} + 4\sqrt{3} - \sqrt{5}$$

$$\text{d. } \sqrt{3} - 16$$

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|------|---|--|--|
| 2-88 | a. $1 + \sqrt{2}$
b. $\frac{1}{3}(\sqrt{5} - \sqrt{2})$ | c. $\frac{1}{2} + \frac{1}{2}\sqrt{5}$
d. $\frac{7+\sqrt{5}}{11}$ | e. $6\sqrt{5} - 12$
f. $\frac{1}{5}(9 + 2\sqrt{14})$ |
| 2-89 | a. $\frac{21}{2}\sqrt{3} - 2\frac{1}{2}$
b. $\frac{103}{71} + \frac{80}{71}\sqrt{3}$ | c. $\frac{2}{5}\sqrt{2} + \frac{1}{5}\sqrt{3}$
d. $3\sqrt{2} - 2\sqrt{3}$ | e. $\frac{1}{97}(-56 + 15\sqrt{10} - 6\sqrt{14} + 20\sqrt{35})$
f. $\frac{17}{2}\sqrt{10} + 27$ |
| 2-90 | a. $\frac{1}{17}(9 + 5\sqrt{3} + 10\sqrt{5} + 6\sqrt{15})$
b. $2 + \frac{3}{13}\sqrt{10} - \frac{15}{13}\sqrt{3}$ | c. $4 - 3\frac{1}{2}\sqrt{2}$
d. $\sqrt{3}$ | |
| 2-91 | a. $\frac{1}{12}(3\sqrt{2} + 2\sqrt{3} - \sqrt{30})$
b. $\frac{1}{12}(\sqrt{2} + \sqrt{3} - \sqrt{5})$ | c. $\sqrt{2} + \sqrt{5} + \sqrt{6}$
d. $1 + \sqrt{3} + \sqrt{5}$ | |
| 2-92 | a. $-1 + \frac{1}{4}\sqrt{2} + \frac{1}{2}\sqrt{3} + \frac{3}{4}\sqrt{6}$
b. 14 | c. $2 + \sqrt{2} + \sqrt{3} + \sqrt{6}$
d. $\frac{5}{24}$ | |
| 2-93 | a. 98; b. $\frac{177}{161} + \frac{52}{161}\sqrt{2}$; c. $\frac{1}{30}$; d. 0; e. $2\frac{1}{2}$; f. $\frac{1}{3}$ | | |
| 2-94 | a. $6\sqrt{2}$
b. 68 | c. $10\sqrt{3}$
d. $5\sqrt{5}$ | e. $\frac{1}{2}\sqrt{7}$
f. 88 |
| 2-95 | a. -45
b. $14\sqrt{6}$ | c. 634
d. $4\sqrt{3}$ | e. -30
f. -20 |
| 2-96 | a. 20
b. 1700
c. $3\sqrt{35}$ | d. $50 + 35\sqrt{2}$
e. $3\sqrt{2}$
f. $-8\sqrt{6}$ | |
| 2-97 | a. $\frac{1}{6}\sqrt{6} + \frac{1}{2}\sqrt{2}$ | b. $1\frac{1}{3}\sqrt{2}$ | c. $2\sqrt{7}$ |
| 2-98 | a. $3\sqrt{6}$
b. $4\sqrt{5}$ | c. $10\sqrt{3}$
d. $6\sqrt{3}$ | e. $2\sqrt{14}$
f. $6\sqrt{7}$
g. $3\sqrt{2}$
h. $7\sqrt{2}$ |

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|--|---|
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">2-99</div> <p>a. $6\sqrt{x}$</p> <p>b. $\sqrt{x^2 + x}$</p> <p>c. $2\sqrt{x}$</p> <p>d. $2\sqrt{x}$</p> | <p>e. k.n.</p> <p>f. $(1 + \sqrt{2})\sqrt{x}$</p> <p>g. $4 + x$</p> <p>h. 0</p> |
|--|---|

Tweedegraads vergelijkingen

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|--|---|--|
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">3-1</div> <p>a. $2 \vee 3$</p> <p>b. -2</p> | <p>c. $0 \vee 2$</p> <p>d. $2 \vee 4$</p> | <p>e. $-7 \vee 7$</p> <p>f. $0 \vee 4$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">3-2</div> <p>a. $-2 \vee -4$</p> <p>b. $3 \vee 40$</p> | <p>c. $-9 \vee 10$</p> <p>d. $3 \vee 4$</p> | <p>e. $1 \vee 5$</p> <p>f. -3</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">3-3</div> <p>a. $2 \vee -5$</p> <p>b. $3 \vee 7$</p> | <p>c. $-2 \vee 4$</p> <p>d. $-1 \vee 3$</p> | <p>e. $5 \vee 7$</p> <p>f. $1 \vee 5$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">3-4</div> <p>a. $0 \vee 3$</p> <p>b. $-3 \vee 9$</p> | <p>c. $0 \vee 12$</p> <p>d. $0 \vee 13$</p> | <p>e. $-1 \vee 0 \vee 1$</p> <p>f. $-4 \vee 0$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">3-5</div> <p>a. $-6 \vee -4$</p> <p>b. $-3 \vee -1$</p> | <p>c. $-12 \vee 2$</p> <p>d. -2</p> | <p>e. $-2 \vee 12$</p> <p>f. $-2 \vee 5$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">3-6</div> <p>a. $\pm 2\sqrt{3}$</p> <p>b. $\pm 0,4$</p> | <p>c. ± 4</p> <p>d. $\pm \frac{1}{2}$</p> | <p>e. $\pm 0,9$</p> <p>f. $\pm \frac{3}{2}$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">3-7</div> <p>a. ± 2</p> <p>b. geen opl.</p> <p>c. geen opl.</p> | <p>d. geen opl.</p> <p>e. ± 8</p> <p>f. geen opl.</p> | <p>g. 0</p> <p>h. ± 3</p> <p>i. $\pm \frac{1}{2}$</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">3-8</div> <p>a. $\pm \sqrt{7}$</p> <p>b. $\pm \sqrt{7}$</p> | <p>c. $\pm \frac{3}{4}$</p> <p>d. $\pm \frac{1}{3}$</p> | <p>e. $\pm \sqrt{10}$</p> <p>f. geen opl.</p> |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">3-9</div> <p>a. -6</p> <p>b. $-5, 13$</p> | <p>c. $-9, -3$</p> <p>d. geen opl.</p> | <p>e. $-8, 2$</p> <p>f. $5\frac{4}{5} \vee 6\frac{1}{5}$</p> |

3-10	a. ± 12 b. $\pm \frac{1}{3}$	c. ± 3 d. ± 10	e. geen opl. f. ± 2
3-11	a. -2 b. $\frac{3}{2}$	c. -3 d. $-\frac{23}{5}$	e. 5 f. $\frac{2}{5}$
3-12	a. $-5 \pm \sqrt{7}$ b. $-6 \pm \sqrt{6}$	c. $-4 \pm \sqrt{3}$ d. $-2 \pm \sqrt{7}$	e. $-3 \pm \sqrt{5}$ f. $3 \pm 2\sqrt{6}$
3-13	a. $-2 \pm \sqrt{19}$ b. $5 \pm \sqrt{33}$	c. $-1 \vee 3$ d. $4 \pm \sqrt{15}$	e. $-4 \pm \sqrt{14}$ f. $-3 \pm 2\sqrt{3}$
3-14	a. $10 \vee -10$ b. $1 \vee -1$	c. $9 \vee -9$ d. $4 \vee -4$	e. $13 \vee -13$ f. $0,9 \vee -0,9$
3-15	a. $0 \vee 1$ b. $0 \vee \frac{11}{6}$	c. $0 \vee -1\frac{1}{2}$ d. $0 \vee 14$	e. $0 \vee 3$ f. $0 \vee \frac{1}{7}$
3-16	a. $-6 \vee -4$ b. $-3 \vee -1$	c. $-12 \vee 2$ d. -2	e. $-2 \vee 12$ f. $-2 \vee 5$
3-17	a. $-12 \vee 12$ b. $-\frac{8}{3} \vee \frac{8}{3}$	c. $-2\frac{1}{2} \vee 2\frac{1}{2}$ d. $-\frac{2}{3} \vee \frac{2}{3}$	e. $-0,8 \vee 0,8$ f. $-3\frac{1}{2} \vee 3\frac{1}{2}$
3-18	a. $-1 \vee 12$ b. $-6 \vee 2$	c. $-12 \vee 1$ d. $-3 \vee 4$	e. $-2 \vee 6$ f. $-4 \vee 3$
3-19	a. -5 b. $-7; -3$	c. $-1; 7$ d. -9	e. $-7 \pm \sqrt{3}$ f. $-7; -5$
3-20	$a = 1, b = 2, c = -1$ $x_{1,2} = \frac{-2 \pm \sqrt{2^2 - 4 \cdot 1 \cdot -1}}{2 \cdot 1} = \frac{-2 \pm \sqrt{4 + 4}}{2} \quad x_{1,2} = \frac{-2 \pm 2\sqrt{2}}{2} = -1 \pm \sqrt{2}$		
3-21	a. $-2 \pm \sqrt{3}$ b. $4 \pm \sqrt{10}$	c. $3 \pm \sqrt{7}$ d. $-3 \pm 2\sqrt{2}$	e. $-4 \pm \sqrt{7}$ f. $1; 13$
3-22	a. $-5 \pm \sqrt{2}$ b. $6 \pm \sqrt{6}$	c. $3 \pm \sqrt{11}$ d. $-12; -4$	e. $-7; -3$ f. $2; 6$

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|--|---|--|
| <p>3-23 a. $-1 \pm \sqrt{5}$
b. $\frac{5}{2} \pm \frac{1}{2}\sqrt{13}$</p> | <p>c. $-1 \vee \frac{1}{2}$
d. $-3 \pm \sqrt{5}$</p> | <p>e. $-2\frac{1}{2} \vee 1$
f. $2 \pm \sqrt{5}$</p> |
| <p>3-24 a. $-1, \frac{1}{2}$
b. $2\frac{1}{2} \pm \frac{1}{2}\sqrt{13}$</p> | <p>c. $-1 \pm \sqrt{5}$
d. $-5 \pm \sqrt{5}$</p> | <p>e. $-2\frac{1}{2}, 1$
f. $5 \pm \sqrt{3}$</p> |
| <p>3-25 a. $2 \pm \sqrt{6}$
b. $-\frac{1}{3} \vee 2$</p> | <p>c. $-3 \pm 2\sqrt{2}$
d. $-1\frac{1}{2} \vee 2$</p> | <p>e. geen oplossing
f. $-\frac{6}{5} \vee 2$</p> |
| <p>3-26 a. $2 \pm \sqrt{6}$
b. $-\frac{1}{3} \vee 2$</p> | <p>c. $-3 \pm 2\sqrt{2}$
d. $-1\frac{1}{2} \vee 2$</p> | <p>e. geen oplossing
f. $-\frac{6}{5} \vee 2$</p> |
| <p>3-27 a. $\frac{1}{3} \vee 3$
b. $1 \vee 2\frac{1}{2}$</p> | <p>c. $\frac{5}{4} \pm \frac{1}{4}\sqrt{33}$
d. $1 \pm \sqrt{2}$</p> | <p>e. $3 \pm \sqrt{3}$
f. $\frac{2}{3} \pm \frac{1}{3}\sqrt{19}$</p> |
| <p>3-28 a. $5 \pm 5\sqrt{3}$
b. geen opl.</p> | <p>c. $\frac{13}{6} \pm \frac{1}{6}\sqrt{97}$
d. $\frac{1}{2} \vee 6$</p> | |
| <p>3-29 a. $\frac{-7}{2} \pm \frac{1}{2}\sqrt{5}$
b. $\frac{1}{10} \pm \frac{1}{10}\sqrt{21}$</p> | <p>c. $\frac{-3}{2} \pm \frac{1}{2}\sqrt{33}$
d. 5</p> | |
| <p>3-30 a. $-1 \pm \sqrt{2}$
b. $-5 \vee 1$</p> | <p>c. $\frac{5 \pm 2\sqrt{15}}{5}$
d. -1</p> | |
| <p>3-31 a. 2
b. 0</p> | <p>c. 1
d. 2</p> | <p>e. 0
f. 2</p> |
- 3-32** a. $a = 2$; $b = 5$; $c = 0$; $D = 25$; twee opl
b. $a = 1$; $b = -6$; $c = 9$; $D = 0$; één opl
c. $a = -2$; $b = 10$; $c = -3$; $D = 76$; twee opl
d. $a = -1$; $b = -2$; $c = -13$; $D = -48$; geen opl
e. $a = 4$; $b = 0$; $c = 9$; $D = -144$; geen opl
f. $a = -30$; $b = 6$; $c = 0$; $D = 36$; twee opl
- 3-33** a. $D = 100$; twee opl
b. $D = 220$; twee opl
c. $D = -131$; geen opl

d. $D = 77$; twee opl

e. $D = -4$; geen opl

f. $D = 0$; één opl

3-34	a. 2 b. 0	c. 0 d. 2	e. 2 f. 0
3-35	a. 0 b. 2	c. 1 d. 2	
3-36	a. geen opl. b. $\frac{2}{5}$	c. 6 d. geen opl.	
3-37	a. $-6 \vee 0$ b. $-3 \pm \sqrt{2}$	c. $-7 \vee 1$ d. $1\frac{1}{2} \pm \frac{1}{2}\sqrt{29}$	e. geen opl. f. $-1, 0$
3-38	a. $-3 \vee 7$ b. $\frac{1}{2} \vee 1$	c. $-3 \vee 9$ d. $-2\sqrt{2} \vee 0$	e. 1 f. $0 \vee \frac{7}{3}$
3-39	a. $\frac{-3}{2} \pm \frac{1}{2}\sqrt{29}$ b. geen opl.	c. $3 \vee -9$ d. $\pm \frac{5}{7}$	e. $-\frac{7}{3} \vee \frac{1}{2}$ f. geen opl.
3-40	a. $0 \vee 6$ b. $\frac{3}{2} \pm \frac{1}{2}\sqrt{29}$	c. $\frac{3}{2} \pm \frac{1}{2}\sqrt{5}$ d. geen opl.	
3-41	a. $0 \vee \frac{5}{2}$ b. $\frac{1}{4} \pm \frac{1}{4}\sqrt{5}$	c. $5 \pm 2\sqrt{3}$ d. $-2 \vee 8$	
3-42	a. $-\frac{1}{4} \vee \frac{5}{8}$ b. $2 \vee 30$	c. $-5 \pm 5\sqrt{2}$ d. $\frac{5}{6} \pm \frac{1}{6}\sqrt{19}$	
3-43	a. $-\frac{1}{3} \vee 15$ b. $9 \pm \sqrt{7}$ c. $\frac{1}{2} \vee \frac{1}{10}$	d. $4\frac{9}{10} \pm \frac{7}{10}\sqrt{69}$ e. $2\frac{2}{3} \vee 4$ f. $-1\frac{1}{7} \pm 1\frac{5}{7}\sqrt{2}$	
3-44	a. $3 \pm \sqrt{11}$ b. $1 \pm \sqrt{2}$	c. $6 \pm \sqrt{6}$ d. $4 \vee 6$	e. $-1 \pm \sqrt{5}$ f. $\frac{2}{3} \vee \frac{3}{2}$

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|---|---|---|
| 3-45 a. geen oplossing
b. $-3\frac{1}{2} \pm \frac{1}{2}\sqrt{5}$ | c. $0 \vee 2$
d. $-2\sqrt{7} \vee 2\sqrt{7}$ | e. $0 \vee 9$
f. $1 \vee 9$ |
| 3-46 a. $-3 \pm \sqrt{2}$
b. $-7 \vee 2$ | c. $-5 \vee 6$
d. $-6 \vee 6$ | e. $-4 \vee 5$
f. $1 \vee 3$ |
| 3-47 a. $-\frac{1}{5} \vee -1$
b. $-\frac{1}{3} \vee \frac{1}{2}$ | c. $-\frac{1}{4} \vee -\frac{1}{2}$
d. geen opl. | e. $-\frac{1}{8} \vee -\frac{1}{6}$
f. $\frac{1}{5} \vee -\frac{1}{4}$ |
| 3-48 a. $-\frac{1}{3} \vee 5$
b. $\frac{1}{4} \vee -\frac{2}{3}$ | c. $\frac{1}{5} \vee 7$
d. $\frac{1}{3} \vee 3$ | e. $-\frac{1}{2} \vee -\frac{2}{3}$
f. $\frac{2}{3} \vee \frac{3}{2}$ |
| 3-49 a. $\frac{1}{4} \vee 5$
b. $-\frac{5}{8} \vee 6$ | c. $\frac{1}{3} \vee -\frac{5}{6}$
d. $\frac{1}{5} \vee \frac{1}{4}$ | e. $-\frac{1}{6} \vee \frac{1}{3}$
f. $\frac{4}{5} \vee \frac{5}{4}$ |
| 3-50 a. $p < 12\frac{1}{4}$
b. $p > -3\frac{1}{8}$ | c. $p < 1\frac{1}{3}$
d. $p < 9$ | |
- 3-51** a. $p < -10 \vee p > 10$; b. $-4 < p < 4$; c. $p^2 + 24 > 0$ is waar voor alle waarden van p
- 3-52** a. $p = -3$ met $x = -3$; b. $p = 3$ met $x = 2$
- 3-53** a. $3x + 1 = 0$ heeft één oplossing; b. $D = 9 - 4p$ geeft $p < 2\frac{1}{4}$ verder moet gelden: $p \neq 0$ dus antwoord: $p < 0 \vee 0 < p < 2\frac{1}{4}$
- 3-54** a. $p < 0 \vee 0 < p < 3\frac{1}{8}$; b. $-\frac{9}{16} < p < 0 \vee p > 0$
- 3-55** a. $p > \frac{1}{8}$; b. $-\frac{1}{2} < p < 0 \vee 0 < p < \frac{1}{2}$; c. $p < -2\sqrt{2} \vee p > 2\sqrt{2}$
- 3-56** a. $p = 1$ met $x = -3$; b. $p = -2$ met $x = 1$ of $p = 2$ met $x = -1$

Wortel vergelijkingen & gebroken vergelijkingen

- | | | |
|-----------------------------|------------------------------|----------------------------|
| 4-1 a. 4
b. 8 | c. 17
d. $\frac{17}{2}$ | e. 75
f. $\frac{15}{2}$ |
| 4-2 a. 0; 3
b. 45 | c. $0; \frac{5}{4}$
d. 30 | e. 0; 8
f. ± 9 |

4-3	a. $0; \frac{1}{16}$ b. $0; \frac{3}{16}$	c. $0; \frac{3}{2}$ d. 0	e. 0 f. 0
4-4	a. -2; 2 b. -5; 1	c. -2; 6 d. 5	e. -3; 3 f. 1; 5
4-5	a. 0; 2 b. geen opl.	c. -3; 2 d. geen opl.	e. $-\frac{1}{4}; \frac{13}{4}$ f. 5; 9
4-6	a. 1; 2 b. 2; 3	c. $\frac{13 + \sqrt{217}}{2}$ d. 4	e. 1; 4 f. 3
4-7	a. 8 b. 1	c. 1; 7 d. 9	e. 3; 4 f. 1
4-8	a. 8 b. 4	c. 1; 4 d. 4	e. 10 f. 5
4-9	a. 3 b. 5	c. $\frac{1}{2}$ d. 3	
4-10	a. $-\frac{1}{2}, 2$ b. 9	c. geen opl. d. $-1, -\frac{3}{4}$	
4-11	a. 1 b. -1, -4	c. geen opl. d. -7	
4-12	a. -4	b. 4	c. -1
4-13	a. $\frac{1}{3}$ b. 2	c. $-\frac{1}{6}$ d. 6	e. $-\frac{1}{2}$ f. $\frac{8}{3}$
4-14	a. $-\frac{1}{6}$ b. 17	c. $-\frac{1}{6}$ d. $\frac{13}{4}$	e. $-\frac{1}{10}$ f. 3

4-15	a. $\frac{1}{4}$ b. $-\frac{13}{4}$	c. -10 d. 5	e. $-\frac{3}{2}$ f. $-\frac{7}{2}$
4-16	a. -1 b. $\frac{3}{5}$	c. -7 d. $\frac{7}{6}$	e. $\frac{10}{3}$ f. $\frac{7}{5}$
4-17	a. -17 b. $\frac{121}{25}$	c. $-\frac{1}{9}$ d. $\frac{5}{4}$	e. 1 f. 2
4-18	a. $-\frac{1}{3}$ b. k.n.	c. $-\frac{2}{21}$ d. 2	e. $\frac{2}{5}$ f. $-\frac{6}{13}$
4-19	a. $-\frac{3}{4}$ b. k.n.	c. $-\frac{5}{4}$ d. 0	e. 5 f. $x \neq -7$
4-20	a. k.n. b. -9	c. 0 d. $2, \frac{9}{2}$	e. $-\frac{8}{5}$ f. $-1, 2, -2$
4-21	a. 2 b. geen opl.		c. $-1, 2$ d. $2, -2, 3$
4-22	a. $-\sqrt{5}, \sqrt{5}, 2, -2$ b. $3, -3$		c. 1 d. -3
4-23	a. k.n. b. -4		c. 2 d. k.n.
4-24	a. $0; -\frac{7}{4}$ b. $\frac{15 \pm \sqrt{193}}{4}$		c. k.n. d. 1
4-25	a. $-1; \frac{7}{10}$ b. 0		c. $0; 1$ d. k.n.

4-26

a. 1

b. $3; \frac{5}{3}$

c. k.n.

d. $-\frac{2}{21}$

4-27

a. -4

b. geen opl.

c. $\frac{24}{5}$

d. $-\sqrt{6}, 0, \sqrt{6}$

4-28

a. geen opl.

b. -5

c. geen opl.

d. $\frac{26}{19}$

4-29

a. $x = 2 \vee x = -1$

b. $x = \pm 2 \vee x = 3$

c. $x = 0$

d. $x = \pm 2\sqrt{3}$

e. $x = \pm 2 \vee x = \pm \frac{3}{2}\sqrt{14}$

f. $x = 4$

4-30

a. $x = \pm 3 \vee x = 1$

b. $x = \pm 2 \vee x = \pm \frac{1}{2}\sqrt{2}$

c. $x = 0 \vee x = 3$

d. $x = 0 \vee x = 2 \vee x = \pm\sqrt{3}$

e. $x = 4$

f. $x = 4 \vee x = 16$

4-31 (100, 49)

Cirkelmeetkunde

- 5-35 61°
- 5-36 $45^\circ, 45^\circ$ en 90°
- 5-37 6
- 5-39 5
- 5-42
- 5-43 $80^\circ, 150^\circ$
- 5-44 $70^\circ, 35^\circ, 35^\circ$
- 5-45 $10^\circ, 10^\circ, 15^\circ, 15^\circ, 25^\circ$ en 155°
- 5-46 $55^\circ, 90^\circ, 35^\circ, 15^\circ, 20^\circ, 30^\circ, 150^\circ, 15^\circ, 55^\circ$ en 105°
- 5-47 30°
- 5-48 $30^\circ, 30^\circ, 60^\circ$ en 60°
- 5-49 $70^\circ, 110^\circ, 20^\circ, 50^\circ$
- 5-50 $27,5^\circ, 152,5^\circ, 12,5^\circ, 15^\circ$
- 5-51 44 cm
- 5-52 440 m
- 5-53 223,5 cm
- 5-54 12739 km
- 5-55 **b.** 9π
- 5-56 $2\pi \approx 6,28$ m
- 5-57 $R = 100$ m, $O = 30.000$ m²
- 5-58 $8\pi \approx 25,1$ m
- 5-59 $36 - 4\frac{1}{2}\pi$
- 5-60 308 en 88
- 5-61 8π en 12π
- 5-62 80 cm; $1600\pi \approx 5027$ cm²; $6400 - 1600\pi \approx 1373$ cm²
- 5-63 28; 22
- 5-64 $38\frac{98}{113}; 28\frac{64}{113}$
- 5-65 $64 - 16\pi \approx 13,73; 8 + 8\pi \approx 33,13$
- 5-66 $45 - 7\frac{13}{16}\pi$
- 5-67 $15 + 4\pi$
- 5-68 72π
- 5-69 $42 - 6\frac{3}{4}\pi$
- 5-70 $48 - 4\pi$
- 5-71 8

Combinatoriek

6-4 $\frac{4!}{2!2!} = 6$

6-5 $\frac{7!}{4!} = 210$

6-6 $\frac{9!}{2!2!2!} = 45360$

6-7 $2! = 2, \quad \frac{4!}{2!} = 12, \quad \frac{7!}{3!2!} = 420$

6-8	a. 12	d. $\frac{1}{12}$ e. $\frac{1}{210}$ f. 11
	b. 1320	
	c. 120	

6-9 **a.** $(n-1)n$ | **b.** $\frac{1}{n+1}$ | **c.** $n(n+1)$

6-10 **a.** $\frac{9}{8!}$ | **b.** $\frac{5}{4!}$ | **c.** $\frac{6}{7!}$

6-11	a. $\frac{11}{10!}$	c. $\frac{14}{5!}$ d. $\frac{1}{8!}$
	b. $4!$	

6-12	a. $11!$	c. $\frac{1}{11!}$ d. $\frac{9!}{10!}$
	b. $\frac{1}{4}$	

6-13 Er zijn (veel) meer oplossingen, hier staan er een paar:
 $(0! + 0! + 0!)!$; $(1 + 1 + 1)!$; $(2 + \frac{2}{2})!$; $3 + \sqrt{3 \times 3}$; $4 + 4 - \sqrt{4}$; $5 + \frac{5}{5}$; $6 \times \frac{6}{6}$; $7 - \frac{7}{7}$;
 $8 - \sqrt{\sqrt{8+8}}$; $\frac{9+9}{\sqrt{9}}$; $(\sqrt{10 - \frac{10}{10}})!$

6-14 **a.** Als A drie sets gewonnen heeft, dan is A 'best of five' en komt er geen nieuwe set. **b.** 20

- 6-15** a. Dat de teams slechts éénmaal tegen elkaar uitkomen. **b.** 10
- 6-16** a. 66, **b.** 17
- 6-17** a. 21; **b.** 6
- 6-18** a. 24; **b.** 4; **c.** 6
- 6-19** $3 \cdot 5 \cdot 2 = 30$
- 6-20** $10^3 = 1000$
- 6-21** $6^4 = 1296$
- 6-22** $21^3 \cdot 9^3 = 6.751.269$
- 6-23** $26^2 \cdot 10^2 = 67.600$
- 6-24** a $5 + 5 \times 4 = 25$; **b** $5 + 5 \times 5 = 30$
- 6-25** a.9; **b.**19; **c.**22
- 6-26** a.24; **b.**576; **c.**360
- 6-27** $\binom{10}{2} = 45$
- 6-28** a.5040; **b.**604800
- 6-29** a.32768; **b.**6720; **c.**20
- 6-30** a.1680; **b.**4096; **c.**30
- 6-31** a.5; **b.**210; **c.**5313; **d.**1890
- 6-32** a.56; **b.**256; **c.**24
- 6-33** $P_3^6 = 120$ en dat is meer dan 100, zes kleuren is dus voldoende.
- 6-34** $C_1^6 + C_2^6 + C_3^6 + C_4^6 + C_5^6 + C_6^6 =$
 $6 + 15 + 20 + 15 + 6 + 1 = 63$
- 6-36** $10^9 = 1.000.000.000$, want de nummers moeten met een nul beginnen.
- 6-37** Het gaat om combinaties:
 $\binom{10}{6} = \frac{10 \times 9 \times 8 \times 7 \times 6 \times 5}{6 \times 5 \times 4 \times 3 \times 2 \times 1} = 210$, Sneller is:
 $\binom{10}{4} = \frac{10 \times 9 \times 8 \times 7}{4 \times 3 \times 2 \times 1} = 210$
- 6-38** Aantal kortste wegen van:
a. $A \rightarrow B$ is $\binom{8}{3} = \frac{8 \times 7 \times 6}{3 \times 2 \times 1} = 56$
b. $B \rightarrow C$ is $\binom{6}{3} = \frac{6 \times 5 \times 4}{3 \times 2 \times 1} = 20$

c. $A \rightarrow C$, dan moet je over B dus:

$$\binom{8}{3} \times \binom{6}{3} = 56 \times 20 = 1120$$

d. $A \rightarrow D$ dan ga je van $A \rightarrow B$ en dan op één manier naar D.

$$\text{Dus } \binom{8}{3} \times 1 = 56 \times 1 = 56$$

6-39 a. $A \rightarrow B: \binom{11}{4} = \frac{11 \times 10 \times 9 \times 8}{4 \times 3 \times 2 \times 1} = 330$

b. $A \rightarrow C$ dan: $A \rightarrow E \rightarrow C: 1 \times \binom{6}{3} = 1 \times \frac{6 \times 5 \times 4}{3 \times 2 \times 1} = 20$

6-40 $56 \times 210 = 11760$

6-41	a. 45	c. 1	e. 66
	b. 3	d. 105	f. 1

6-42	a. 4950	c. 236	e. 19900
	b. 1	d. 35	f. 495

6-43	a. 56	c. 126	e. 220
	b. 56	d. 1330	f. 210

6-44 $\binom{3}{0} = 3$, $\binom{6}{4} 15$, $\binom{10}{5} = 252$, $\binom{100}{3} = 161700$, $\binom{48}{4} = 194580$

6-45	a. 48	c. 720	e. 455
	b. 3628800	d. 3003	f. 3160

6-46	a. 45	c. 90
	b. 40320	d. 360

6-47	a. 10	c. 42
	b. 24	d. 120

6-48 $C_3^{40} = 9880$

6-49 $C_4^{50} = 230300$

6-50 $P_3^{12} = 1320$

6-51 $3^6 = 729$

6-52 $7 \cdot 5 \cdot 7 = 245$

6-53 $P_8 = 8! = 40320, 403200 \text{ sec} = 112 \text{ uur}$

6-54 $P_3^8 = 336$

6-55 $C_4^{25} = 12650$

6-56 $C_6^{13} = 1716$

6-57 $2 \cdot \frac{15!}{6!} = 3.632.428.800$

6-58 $C_3^{12} = 220, P_3^{12} = 1320$

6-59 $a^7 + 7a^6b + 21a^5b^2 + 35a^4b^3 + 35a^3b^4 + 21a^2b^5 + 7ab^6 + b^7$

6-60 a. $1 + 9x + 27x^2 + 27x^3$ b. $10^5 + 10^5 + 4 \cdot 10^4 + 8 \cdot 10^3 + 80 \cdot 10 + 32 = 248832$	c. $16 - 32y + 24y^2 - 8y^3 + y^4$ d. $4x^2 + 12xy + 9y^2$
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6-61 a. 1111 b. 11101010	c. 10110 d. 1000100
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6-62 a. 5 b. 54	c. 28 d. 27
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6-63 a. 1110 b. 10001	c. 1100 d. 11110101
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6-64 a. 101101 b. 111100	c. 100011 d. 11110111100
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Meetkunde

- 7-1 60 cm^3 ; 30 cm^3 ; 6 cm^2 ; ja
- 7-2 NB nummer zes is stiekem een "scheef prisma".
- 7-3 **a.** $2,76 \text{ m}^2$; **b.** $0,96 \text{ m}^2$; **c.** $2,208 \text{ m}^3$
- 7-4 32; 40; 36
- 7-5 36 cm^3 ; 54 cm^3
- 7-6 $2,2 \text{ m}^3$
- 7-7 1,6 m; 4,4 m; $97,4 \text{ m}^3$
- 7-8 42 liter; 35 dm^3 ; $1,1 \text{ m}^2$
- 7-9 1.000.000 liter; €1666
- 7-10 4,6 liter
- 7-11 809 ml; 8 ml
- 7-12 282,7 liter; 188,5 cm
- 7-13 1325 cm^3 ; 79%
- 7-14 45
- 7-15 **a.** $4,48 \text{ dm}^3$; **b.** 50,6 kg
- 7-16 2035 liter per minuut
- 7-17 6; ja; $\frac{1}{6}$; $\frac{1}{3}$
- 7-18 20; $6\frac{2}{3}$; 14
- 7-19 $21\frac{1}{3}$; $10\frac{2}{3}$; $10\frac{2}{3}$
- 7-20 **a.** 42 cm^3 ; $42\frac{2}{3}$; $41\frac{2}{3}$ **b.** 22:43
- 7-21 28; 10950; 11200
- 7-22 balk(toren): 4176; balk(schip): 4320; piramide(toren): 288; prisma(schip) 540;
bij elkaar: 9324 m^3

7-23 740

7-24 **a.** 216; **b.** $\sqrt{4,5^2 + 8^2} \approx 9,1788$ **c.** 166

7-25 94,2 cm³

7-26 0,177 km³

7-27 **a.** 18,84 cm³; **b.** 17,6 g

7-28 3976 l

7-29 196 g

7-30 0,75 m; 156 m; 1:24

7-32 2; 2,7

7-33 1,8; 94 mm

7-34 1,7; 9,2 cm

7-35 1,5; 27 mm; 0,73; 26 mm

7-36 8,8; 132 cm

7-37 0,49; 45 mm

7-38 **a.** 42 m; **b.** 12 m

7-39 25 stuks; 25 ×

7-40 3,25 cm²

7-41 26 cm²

7-42 8 l

7-43 175

7-44 225 g

7-45 4492 m²

7-46 9; k=3

7-47 **a.** $k = \sqrt{8}$ dus $28,3 \times 42,4$ cm; **b.** $k = \sqrt{12}$ dus $52,0 \times 34,6$ cm; **c.** $k = \frac{25}{15} = \frac{5}{3}$, 417 cm²

- 7-48 5,4
- 7-49 45×30 ; 15×10
- 7-50 **a.** $4,8 \text{ m}^2$; **b.** 1,31; **c.** 3,67 m bij 1,53 m
- 7-51 9; 3; 27
- 7-52 262 l; 32 dm^2 ; 8,1 dm
- 7-53 29 ml
- 7-54 9375 ml, minder; 100
- 7-55 1,7; 3,7 l; 486 cm^2
- 7-56 $\frac{3}{4}$; 19 ml; 88 ml; 94 cm^2
- 7-57 37,5 m, 12,8 m; $1181,3 \text{ m}^3$; 405 m^2 ; 4,5 m, 55 treden; 75%; 87°
- 7-58 2
- 7-59 2; 3; 1; 10; 2,57; 4,38; 9,56; 0,95
- 7-60 0.87; $107,8 \text{ cm}^2$
- 7-61 1,19; 17,3 cm
- 7-62 1,19; $2,15 \text{ m}^2$; 101,2 cm
- 7-63 96 cm^3 ; 40 cm^3 ; 16 cm^3
- 7-64 $25\pi \text{ cm}^3$
- 7-65 $91.000 \text{ cm}^3 = 91 \text{ l}$; 1838 cm^2
- 7-66 $948 \text{ cm}^3 = 0,948 \text{ dm}^3$; 0,65 kg; 81 g
- 7-67 1,4; $17,6 \text{ cm}^2$; 192 ml; 2; 560 ml
- 7-68 98; 6,4 en 4
- 7-69 37%
- 7-70 **a.** $A'C' = 6\frac{2}{3}$; $B'C' = 5$; $k = \pm\frac{5}{6}$
b. $A'C' = 22\frac{1}{2}$; $B'C' = 35$; $k = \pm 2\frac{1}{2}$
c. $A'C' = 9$; $B'C' = 6$; $k = \pm\frac{3}{5}$

$$\boxed{7-71} \quad PQ = 4\frac{1}{5}, \quad PR = 4\frac{4}{5}$$

$$\boxed{7-72} \quad PQ = 4\frac{1}{2}, \quad QR = 5\frac{1}{4}$$

$$\boxed{7-73} \quad RQ = 5$$

$$\boxed{7-74} \quad PQ = 72 \text{ en } QR = 63$$

$$\boxed{7-75} \quad 12 \text{ en } 18$$

$$\boxed{7-76} \quad 22\frac{1}{2} \text{ en } 15$$

$$\boxed{7-78} \quad BE = 7\frac{1}{5}; \quad CE = 5\frac{2}{5} \text{ en } AE = 9\frac{3}{5}$$

$$\boxed{7-79} \quad BD = 30; \quad DS = x = 10; \quad AS = 4\sqrt{13} \text{ en } CS = 2\sqrt{13}$$

$$\boxed{7-80} \quad CD = 4; \quad CE = 2\frac{2}{7}; \quad AE = 3\frac{3}{7}\sqrt{5}; \quad BD = 6\sqrt{5}.$$

$$DS = x = 10; \quad AS = 4\sqrt{13} \text{ en } CS = 2\sqrt{13}$$

7-81 $h_a : h_b = 3 : 2$; $h_a : h_c = 9 : 4$; $h_b : h_c = 3 : 2$ ofwel $h_a : h_b : h_c = 9 : 6 : 4$

7-82 $BF = 4\frac{4}{5}$

7-83 4, $5\frac{1}{3}$ en 1

7-84 12, $3\frac{1}{3}$ en $8\frac{2}{3}$

7-85 $1\frac{5}{7}$

7-86 $1\frac{2}{3}$ en $4\frac{1}{3}$.

7-88 $BE = 4$

7-89 $SQ = 4$; $RS = 5\frac{1}{3}$ en $QR = 6\frac{2}{3}$

7-90 $BC\sqrt{193} \approx 13,89$ en $AD \approx 6,87$ en $BD \approx 5,89$

7-91 $BC\sqrt{21}$, $AB = \sqrt{70}$ en $BD = \sqrt{30}$

7-92 $MN = 4\frac{1}{2}$; $KL = \sqrt{13}$; $KN = \frac{3}{2}\sqrt{13}$

7-93 $TU = 9$, $TV = 16$ en $SV = 20$

7-94 **a.** 36, **b.** 28, 21 en 14

7-95 $11\frac{1}{4}$ en $1\frac{3}{4}$

7-97 $AB = 8\frac{1}{3}$, $AC = 5$, $BC = 6\frac{2}{3}$ en $BD = 5\frac{1}{3}$

7-98 $h_c = 12$, $h_A = h_B = 9\frac{3}{13}$

7-99 $AQ \parallel DC$, dus: $\triangle APQ \sim \triangle DPC$, $AQ = 4$.

7-100 $CQ \parallel DA$, dus: $\triangle CPQ \sim \triangle DPA$, $CQ = \frac{8}{3}$.

7-101 $2\frac{2}{3}$, $3\frac{3}{4}$

7-102 4, 5 en $3\frac{3}{4}$.

7-107 $5\frac{1}{2}$

7-108 4

7-109 20

7-110 $15 = 6\frac{1}{4} + 8\frac{3}{4}$ en $18 = 7\frac{1}{2} + 11\frac{1}{2}$

7-111 $4\frac{1}{2}$

7-112 18 en 27.

7-113

$$\left. \begin{array}{l} \angle P_1 = \angle P_2 (\text{overstaande hoeken}) \\ \angle A_1 = \angle M_1 (\text{Z-hoeken}) \end{array} \right\} \xRightarrow{hh} \triangle ABP \sim \triangle MDP \Rightarrow \frac{BP}{DP} = \frac{2}{1} = \frac{AB}{DM} \Rightarrow 2DM = AB \text{ ofwel: } DM = \frac{1}{2}AB$$

verder geldt: $CD = AB$ (overstaande zijden in een parallellogram) dus $DM = \frac{1}{2}CD$ qed

7-114

a. Nee, in de figuur zie je een tegenvoorbeeld.

b. Nee, in de figuur zie je een tegenvoorbeeld.

c. Ja, dan wel!

$$\boxed{7-115} \quad AP = \frac{b^2}{a}$$

$$\boxed{7-116} \quad PQ = \sqrt{ab}$$

$$\boxed{7-117} \quad AP = 3 \text{ en } CL = 1\frac{1}{2}.$$

$$\boxed{7-118} \quad 2, 1, 2 \text{ en } 3.$$

$$\boxed{7-119} \quad BK = 3\frac{3}{5}; KL = 1\frac{1}{5}\sqrt{34}$$

$$\boxed{7-120} \quad EQ = 3\frac{3}{7}$$

$$\boxed{7-121} \quad 10 \text{ en } 16$$

$$\boxed{7-123} \quad \mathbf{a.} \text{ middenparallel; } \mathbf{b.} -\frac{1}{2}; \mathbf{c.} EZ = \frac{1}{2}BZ, DZ = \frac{1}{3}CD; \mathbf{d.} 2 : 1$$

$$\boxed{7-124} \quad 18 \text{ en } 10$$

$$\boxed{7-125} \quad \mathbf{a.} \sqrt{41} \text{ en } \frac{2}{3}\sqrt{41} \quad \mathbf{b.} 2$$

$$\boxed{7-126} \quad \mathbf{a.} 36 \quad \mathbf{b.} 7\frac{1}{2}$$

$$\boxed{7-127} \quad 28$$

$$\boxed{7-128} \quad 3\frac{9}{17}$$

$$\boxed{7-129} \quad \frac{4}{5}\sqrt{5}$$

$$\boxed{7-130} \quad CD = 12; AE = 9\frac{3}{13}$$

$$\boxed{7-131} \quad CF = 1\frac{3}{5}\sqrt{5}$$

$$\boxed{7-132} \quad \frac{32}{\sqrt{137}}$$

$$\boxed{7-134} \quad \mathbf{a.} 5^2 = 3^2 + 4^2; \mathbf{b.} \text{ bissectrices; } \mathbf{c.} \text{ Opp}\triangle ABM = 2r; \mathbf{d.} \text{ Opp}\triangle ABC = 6r; \\ \mathbf{e.} \text{ Opp}\triangle ABC = 6; \mathbf{f.} r = 1$$

7-135 **a.** $1 + 2 + 3 = 1 \times 2 \times 3 = 6$; **b.** symmetrie; **c.** $30 - 60 - 90^\circ \Leftrightarrow 1 : 2 : \sqrt{3}$;
d. $O = \frac{1}{2} \times 2\sqrt{3} \times 3 = 3\sqrt{3}$; **e.** $\sqrt{3} + \sqrt{3} + \sqrt{3} = 3\sqrt{3} = \sqrt{3} \times \sqrt{3} \times \sqrt{3}$;
f. $MC = \sqrt{5}$; de hoogte is: $1 + \sqrt{5}$; Pythagoras geeft: $(1 + \sqrt{5})^2 + \phi^2 = (2 + \phi)^2$
 en dat geeft $\phi = \frac{1 + \sqrt{5}}{2}$; **g.** $O = \frac{1}{2} \times 2\phi \times (1 + \sqrt{5}) = 2\phi^2 = 3 + \sqrt{5}$;
h. $a \cdot b \cdot c = \phi \cdot 2 \cdot \phi = 2\phi^2 = 3 + \sqrt{5}$ en $a + b + c = \phi + \phi + 2 = 3 + \sqrt{5}$.

7-136 6

7-137 10

7-138 10

7-140 **a.** 24, 192 **b.** 8

7-141 $O' = k^2 O \Rightarrow 100 = k^2 \cdot 4 \times 16 \rightarrow k^2 = \frac{100}{64} \rightarrow k = \frac{5}{4}$

7-142 ja; 125; 343

7-144 **a.** 80 **b.** 10.000 **c.** 30

7-145 **a.** 62, 30 **b.** 558, 810 **c.** 15360 **d.** 992

7-147 **a.** 108 **b.** $\frac{4}{3}$ **c.** 10

7-148 €40,50

7-149 deze is $8\times$ zo groot

7-150 $\frac{1}{4} \text{ m}^2$

7-151 **a.** $27\times$

7-152 5 $5^2 \cdot 4 = 100$

7-153 **a.** 40 **b.** 160 **c.** $17\frac{7}{9}$

7-154 $k^2 = \frac{2}{8} = \frac{1}{4}$ dus $k = \frac{1}{2}$

- 7-155 $r_B = 10\frac{2}{3}$
- 7-156 170 m
- 7-157 180 m; 45 m
- 7-158 60 m
- 7-159 108
- 7-160 283,52
- 7-161 64; $BT = \sqrt{8^2 + 6^2}$; $DT = \sqrt{6^2 + 4^2}$; $88 + 8\sqrt{13}$
- 7-162 2,3; 18 cm²
- 7-163 1,26; 4,4 cm; 4,29; 0,65 cm²
- 7-164 874,32 m³
- 7-165 6
- 7-166 81°
- 7-167 6; 20; 14
- 7-168 60°; 75°; 82,5°
- 7-169 12 cm
- 7-170 66°
- 7-171 25
- 7-172 11,5°
- 7-173 3:8
- 7-174 13,5°
- 7-175 18
- 7-176 71,25
- 7-177 20
- 7-178 42°
- 7-179 45
- 7-180 115,5°
- 7-181 28
- 7-182 51°
- 7-183 28
- 7-184 51°
- 7-185 9
- 7-186 61,5°
- 7-187 15
- 7-188 130°
- 7-189 8

Goniometrie

8-2 a. 14° b. 22° c. 45°

8-3 a. 200 m b. 800 m c. 150 m

8-4 b. 1,8 c. 0,36

8-5 a. $\angle CAB = \angle C'AB'$ en $\angle B = \angle B'$

b. $\frac{AC}{AC'} = \frac{BC}{B'C'} = \frac{AB}{AB'}$

c. $\frac{BC}{B'C'} = \frac{AB}{AB'} \Leftrightarrow BC \cdot AB' = AB \cdot B'C' \Leftrightarrow \frac{BC}{AB} = \frac{B'C'}{AB'}$

8-6 $\frac{3}{4}$

8-7 $\frac{2}{3}$

8-8 $\frac{4}{2\sqrt{2}} = \frac{2}{\sqrt{2}} = \sqrt{2}$

8-10 $\frac{4}{3}$ $\frac{1}{5}$

8-11 $BC \approx 1,6$ $\tan 18^\circ \approx 0,3$

8-12	a. 0,781	d. 0,424	g. 0,070
	b. 0,839	e. 1,235	h. 2,747
	c. 57,290	f. 0,017	i. 0,466

8-13	a. 0,208	c. 0,500	e. 0,743
	b. 0,999	d. 0,017	f. 1,000

8-14	a. 39°	c. 61°	e. 84°
	b. 79°	d. 27°	f. 3°

8-15	a. 18°	c. 35°	e. 49°
	b. 71°	d. 30°	f. 19°

8-16	a. 37°	c. 19°	e. 60°
	b. 89°	d. 35°	f. 30°

8-17 $\tan \beta = \frac{AC}{AB}$ en $\tan \gamma = \frac{AB}{AC}$

8-18 a. $\sin \alpha = \frac{BC}{AC}$, $\cos \alpha = \frac{AB}{AC}$, $\tan \alpha = \frac{BC}{AB}$

b. $\sin \gamma = \frac{AB}{AC}$, $\cos \gamma = \frac{BC}{AC}$, $\tan \gamma = \frac{AB}{BC}$

8-19	a. 6,846	c. 6,761	e. 3,111
	b. 38,332	d. 7,247	f. 30,794

8-20 **b.** $\tan \angle D = \frac{EF}{DE}$, $\tan \angle F = \frac{DE}{EF}$

8-21 **a.** AC **b.** $\frac{AD}{AC}$, $\frac{CD}{AC}$, $\frac{AD}{CD}$

8-22	a. $\frac{CD}{AC}$	d. $\frac{CD}{BC}$	g. $\frac{BD}{BC}$
	b. $\frac{AD}{AC}$	e. $\frac{BC}{BD}$	h. $\frac{CD}{BC}$
	c. $\frac{CD}{AD}$	f. $\frac{CD}{BD}$	i. $\frac{BD}{CD}$

8-23 **a.** $\triangle ADC$, CD, AD

b. $\tan \angle A = \frac{CD}{AD}$

c. $\tan \angle B = \frac{CD}{BD}$, $\tan \angle C_1 = \frac{AD}{CD}$, $\tan \angle C_2 = \frac{BD}{CD}$.

d. Er wordt vanuit gegaan dat $\angle C = 90^\circ$

8-24 28° , 62°

8-25 67°

8-26 $\tan \alpha = \frac{BC}{AC}$; 2,66

8-27 $\tan \beta = \frac{AC}{AB}$; 2,91

8-28 4,44

8-29 39,25

8-30 **a.** AC = 12

b. $\frac{12}{13}$, $\frac{5}{13}$, $\frac{12}{5}$

c. $\frac{13}{13}$, $\frac{13}{13}$, $\frac{12}{12}$

8-31 **a.** $\sin \alpha = \frac{BC}{AC}$, $\sin 20^\circ = \frac{BC}{12,6}$. **b.** 4,309

c. 1. 11,840

$$2. \cos \alpha = \frac{AB}{AC}, \cos 20^\circ = \frac{AB}{12,6}.$$

$$AB = 12,6 \cos 20^\circ \approx 11,840$$

8-32 37°

8-33 13°

8-34 63°

8-35 **a.** $\sin \beta$ **b.** 4,915

8-36 $AC \approx 1,798$ en $BC \approx 0,877$

8-37 $AB \approx 4,448$ en $BC \approx 5,365$

8-38 $\alpha = 32^\circ$ en $\beta = 58^\circ$

8-39 **b.** $CD = \sqrt{21}$

c. $\angle ACD \approx 23,578^\circ \approx 24^\circ$

d. $\angle A \approx 66^\circ$, $\angle B \approx 66^\circ$ en $\angle C \approx 47^\circ$.

8-40 $CD \approx 5,638$ en $AB \approx 4,104$

8-41 39°

8-42 104 m

8-43 22°

8-44 27,6 m

8-45 11,9

8-46 13,05

8-47 **b.** 68° **c.** 51° **d.** 1,028

8-48 3,73

8-49 $\beta = 63^\circ$ en $\gamma = 117^\circ$

8-50 **b.** 44° **c.** 5,6

8-51 **a.** $\triangle APM \cong \triangle ARM$ **b.** 4,289 **c.** 21,22 **d.** 21,2

8-52 **c.** 283 m

8-53 **a.** $\angle C_1 = 14^\circ$ en $\angle C_2 = 5^\circ$ **b.** $x = 0,249 \cdot d$ **c.** $y = 0,087 \cdot d$
d. $x + y = 0,337 \cdot d$ **e.** $d = 89$ m

8-54 $4\sqrt{2}, 4\sqrt{2}$

8-55 $21\sqrt{3}, 42$

8-56 $88, 44\sqrt{3}$

8-57 $5, 10$

8-58 $2\sqrt{3}, 4\sqrt{3}, 6, 6\sqrt{2}$

8-59 $3\sqrt{2}, 3\sqrt{2}, 6\sqrt{2}, 3\sqrt{6}$

8-60 $6\sqrt{3}, 6$

8-61	a. 0	d. 0	g. -1
	b. 1	e. -1	h. 0
	c. 0	f. 0	i. b.n.

8-62	a. 0,940	d. 0,438	g. -0,087
	b. -0,643	e. -0,988	h. -0,921
	c. -0,781	f. 0,017	i. -0,649

8-63	a. $\frac{1}{2}\sqrt{2}$	c. $\frac{1}{2}$	e. $-\frac{1}{2}\sqrt{3}$
	b. $-\frac{1}{2}\sqrt{2}$	d. $-\frac{1}{2}\sqrt{3}$	f. $\frac{1}{2}$

8-64	a. $\alpha \approx 17^\circ \vee \alpha \approx 163^\circ$	c. $\alpha \approx 64^\circ \vee \alpha \approx 116^\circ$	e. $\alpha \approx 14^\circ \vee \alpha \approx 166^\circ$
	b. $\alpha \approx 96^\circ$	d. $\alpha \approx 85^\circ$	f. $\alpha \approx 117^\circ$

8-65	a. $\alpha = 0^\circ \vee \alpha = 180^\circ$	c. $\alpha = 60^\circ \vee \alpha = 120^\circ$	e. $\alpha = 90^\circ$
	b. $\alpha = 90^\circ$	d. $\alpha = 135^\circ$	f. $\alpha = 120^\circ$

8-66

a. tussen 0° en 180° is $\sin \alpha$ positief

b. omdat $-1 \leq \sin \alpha \leq 1$

8-67	a. $\alpha \approx 19^\circ \vee \alpha \approx 161^\circ$	c. geen enkele α	e. $\alpha \approx 48^\circ \vee \alpha \approx 132^\circ$
	b. $\alpha \approx 48^\circ$	d. $\alpha \approx 110^\circ$	f. geen enkele α

8-68

a. $\frac{16}{25}$

b. $\frac{9}{25}$

c. $\cos \alpha = -\frac{3}{5}$ of $\cos \alpha = \frac{3}{5}$

d. $\tan \alpha = -\frac{4}{3}$ of $\tan \alpha = \frac{4}{3}$

8-69 $\sin \alpha = -\frac{3}{5}$ of $\sin \alpha = \frac{3}{5}$
 $\tan \alpha = \frac{3}{4}$ of $\tan \alpha = -\frac{3}{4}$.

8-70 $\cos \alpha = -\frac{5}{13}$
 $\tan \alpha = -\frac{12}{5}$.

8-71 $\sin \alpha = \frac{1}{3}$.

8-72 $\cos \alpha = -\frac{1}{4}\sqrt{15}$ of $\cos \alpha = \frac{1}{4}\sqrt{15}$.

8-73 $\text{Opp}(\triangle ABC) = \frac{1}{2} \cdot AB \cdot BC \sin \angle B$
 $\text{Opp}(\triangle ABC) = \frac{1}{2} \cdot BC \cdot AC \sin \angle C$

8-74 12,045

8-75 12,632

8-76 41,366

8-77 $\frac{27}{4}\sqrt{3}$, 32, $54\sqrt{3}$

8-78 **a.** 104,1; 40,4; 35,2; 77,6; 74,9; 11,0 m
b. 7233,4 m²

8-79 **a.** 72°; **b.** 7,053; **c.** 85,595; **d.** 27,502

8-80 **a.** 3,139; **b.** 99,93%; **c.** $\pi \approx 3,139$; **d.** 0,07%; **e.** nee, nee

8-81 **a.** 36°, 72° en 108°; **b.** 9,511

8-82 $b \approx 4,9$ en $c \approx 6,6$.

8-83 $b \approx 5,6$ en $c \approx 4,6$.

8-84 $DF = 6\sqrt{2}$

8-85 $AB = 1112$ meter.

8-86 $b = 3$

8-88 **b.** $\sin \gamma \approx 0,511$ **c.** $\gamma \approx 31^\circ$

8-89 **b.** $\sin \beta \approx 0,704$ **c.** 135° en 45°

8-90 **a.** $\odot(C, 2)$ snijdt het andere been van hoek A niet.

b. $\sin \beta \approx 1,299$. Dit is niet mogelijk.

8-91 76° of 104° .

8-93 27° , 78°

8-94 **a.** $\beta = 45^\circ$; $\gamma = 103^\circ$ of $\beta = 135^\circ$; $\gamma = 13^\circ$

b. $\beta = 25^\circ$; $\gamma = 123^\circ$

c. 2,120

8-95 86°

8-96 108°

8-97 $\cos \angle K = \frac{1}{2}$, $\angle K = 60^\circ$

8-98 45°

8-100 12,5

8-101 $\sqrt{61}$

8-102 1,313; 129°

8-103 61°

8-104 6,890 km

8-105 55,1; 91°

8-107 2691 m

8-108 11,696 m

8-109 MT = 33 m; LN = 31 m

8-110 $x = 30^\circ$

Analytische meetkunde

9-1 A(-5, 3), B(6, 1), C(3, 5; -3, 5), D(0, -4), E(-3, 0), F(6, 0)

9-4 **a.** afst= $2\sqrt{5}$; midden: (-1, 3) **b.** afst=3; midden: $(1, 3\frac{1}{2})$

9-5 a. $\text{afst} = \sqrt{41}$; midden: $(-1\frac{1}{2}, 4)$ b. $\text{afst} = \sqrt{17}$; midden: $(-1, 4\frac{1}{2})$

9-6 a. $\text{afst} = \sqrt{5}$; midden: $(-3\frac{1}{2}, 5)$ b. $\text{afst} = \sqrt{26}$; midden: $(-1\frac{1}{2}, 5\frac{1}{2})$

9-7 P: l; Q: l; R: k, l en m

9-8 P: b; Q: c; R: a en b

9-9

x	-3	-2	-1	0	1	2	3	4	5
y	-9	-7	-5	-3	-1	1	3	5	7

9-10

x	-2	-1	0	1	2	3	4
$y_1 = \frac{1}{2}x + 1$	0	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
$y_2 = -2x + 5$	9	7	5	3	1	-1	-3
$y_3 = 1\frac{1}{2}x$	-3	$-1\frac{1}{2}$	0	$1\frac{1}{2}$	3	$4\frac{1}{2}$	6
$y_4 = 3x - 4$	-10	-7	-4	-1	2	5	8

9-11 ja, ja

9-12 nee, ja

9-13

A(2, 4)	en	B(0, 0)
C(1, -3)	en	D(5, 5)
E(0, 8)	en	F(-2, 0)
G(0, -4)	en	H(-2, 0)

9-14 (4, 0) en (0, -6)

9-15 a. (0, -4) en (3, 0)

b. Alleen B

c. $p = 4\frac{1}{2}$

9-16 a: rico=3 b: rico=2 c: rico=3/2 d: rico=-1
e: rico=-1/3 f: rico=5/2 g: rico=-3/2

9-18 $y = \frac{1}{2}x$

9-23 **a.** (0,5) en (2,0); **b.** B en C; **c.** $p = 1\frac{1}{5}$

9-24 **a.** (0,-5) en (2,0); **b.** A en C; **c.** $p = 2\frac{4}{5}$

9-25	lijn	r.c.	doorsnijpunt y-as
	l	3	-4
	m	-2	5
	n	$\frac{1}{3}$	5
	o	$\frac{5}{3}$	10

9-26	lijn	r.c.	doorsnijpunt y-as
	l	$-1\frac{1}{2}$	3
	m	2	-2
	n	$\frac{1}{2}$	$-\frac{3}{4}$
	o	$\frac{1}{2}$	2

9-31 $y = 3$ $y = -2$ $x = 1$ $x = -2$

9-32 $\text{rico}_a = -1$; $\text{rico}_b = \text{b.n.}$; $\text{rico}_c = -\frac{1}{3}$; $\text{rico}_d = -\frac{1}{3}$
 $c \parallel d$

9-34 $\text{rico}_a = -2$ $\text{rico}_e = 2$ i heeft geen rico
 $\text{rico}_b = -3$ $\text{rico}_f = -\frac{1}{3}$ $\text{rico}_j = -3$
 $\text{rico}_c = -1$ $\text{rico}_g = \frac{1}{2}$ $\text{rico}_k = 1$
 $\text{rico}_d = -2$ $\text{rico}_h = \frac{1}{2}$ $\text{rico}_l = -3$

evenwijdig: a en d, g en h

en: b, j en l

loodrecht: $a \perp g$ $d \perp g$ $a \perp h$ $c \perp k$

9-35 $y = 2x - 1$

9-36 $l: y = -2x + 1$

9-37 $y = -2x - 1$

9-38 $\text{rico}_l = -2; \text{rico}_{AB} = -2; \text{rico}_m = \frac{1}{2};$

9-39 $p: 4x - 2y = 20$

9-40 $\begin{array}{l} l \quad y = 3x \\ m \quad 2x - 4y = -8 \\ n \quad y = 3x + 1 \\ o \quad x + 3y = 14 \\ p \quad y = 2x \end{array}$

9-41 **a.** $\text{rico}_l = -\frac{1}{2};$ **b.** $AB: y = -x + 3;$ **c.** $y = \frac{1}{2}x + 5\frac{1}{2}$

9-42 $\begin{array}{l} l: y = x + 1 \\ m: y = 3x + 3 \\ n: y = 3 \end{array}$

9-43 $y = 4x - 23$

9-44 $y = 3x - 3$

9-45 $y = 3x - 3$

P	l	m l	n ⊥ l
(3,2)	$y = 3x - 1$	$y = 3x - 7$	$y = -\frac{1}{3}x + 3$
(6,1)	$y = \frac{1}{2}x$	$y = \frac{1}{2}x - 2$	$y = -2x + 13$
(8,0)	$y = -x + 3$	$y = -x + 8$	$y = x - 8$
9-46 (0,0)	$y = 2x + 6$	$y = 2x$	$y = -\frac{1}{2}x$
(7,1)	$y = -5x - 3$	$y = -5x + 36$	$y = \frac{1}{5}x - \frac{2}{5}$
(3,0)	$y = 1$	$y = 0$	$x = 3$
(5,8)	$y = x$	$y = x + 3$	$y = -x + 13$
(2,2)	$x = 3$	$x = 2$	$y = 2$

P	l	m l	n ⊥ l
(5,6)	$y = -3x - 1$	$y = -3x + 21$	$y = \frac{1}{3}x + 4\frac{1}{3}$
(3,2)	$y = \frac{1}{2}x$	$y = \frac{1}{2}x + \frac{1}{2}$	$y = -2x + 8$
(3,4)	$y = 4x + 3$	$y = 4x - 8$	$y = -\frac{1}{4}x + 4\frac{3}{4}$
9-47 (0,4)	$y = -3x + 6$	$y = -3x + 4$	$y = \frac{1}{3}x + 4$
(4,0)	$y = \frac{1}{3}x - 3$	$y = \frac{1}{3}x - 1\frac{1}{3}$	$y = -3x + 12$
(3,2)	$y = -5$	$y = 2$	$x = 3$
(5,2)	$y = -\frac{2}{3}x$	$y = -\frac{2}{3}x + 5\frac{1}{3}$	$y = \frac{3}{2}x - 5\frac{1}{2}$
(-2,2)	$x = -3$	$x = -2$	$y = 2$

9-48 (1,4)

Hoofdstuk

9-49 $l: y = 3x + 3; m: y = -x - 1; (-1, 1)$

9-50 $\begin{array}{l} l \cap m = (-5\frac{1}{3}, -8\frac{1}{3}) \\ l \cap n = (0, -3) \\ m \cap n = (-1\frac{1}{15}, \frac{1}{5}) \end{array}$

9-51 $S(3, 1)$

9-52 **a.** $(1, -1)$ | **c.** $(14\frac{1}{2}, 3)$ | **e.** $(-6, 9)$

9-53	a. $(1, -2)$	c. $(2, -1)$	e. $(1, -3)$
	b. $(1, 1)$	d. $(2, 4)$	f. $(0, -4)$

9-54

 $l \cap m = (2, 2); l \cap n = (0, -2); m \cap n = (-3, 1)$

9-55 = betekent: vallen samen; $\parallel$ betekent de lijnen lopen evenwijdig.

	a	b	c	d	e	f	g	h
a	=	$(1, 6)$	$(0, 5)$	$(0, 5)$	$\parallel$	=	$(0, 5)$	$(-3, 2)$
b		=	$(2, 4)$	$\parallel$	$(2, 4)$	$(1, 6)$	$(2, 4)$	$(3, 2)$
c			=	$(0, 5)$	$(2, 4)$	$(0, 5)$	=	$(6, 2)$
d				=	$(1, 3)$	$(0, 5)$	$(0, 5)$	$(1\frac{1}{2}, 2)$
e					=	$\parallel$	$(2, 4)$	$(0, 2)$
f						=	$(0, 5)$	$(-3, 2)$
g							=	$(6, 2)$
h								=

9-58

 $AB : y = x + 8, C \text{ ligt op } AB$

9-59

 $AB: y = -2 \longrightarrow h_C : x = 2$
 $AC: y = x + 2 \longrightarrow h_B : y = -x + 1$
 $H = h_C \cap h_B = (2, -1)$

$$\begin{array}{l} \boxed{9-60} \quad \left. \begin{array}{l} AB: y = \frac{1}{2}x + 1\frac{1}{2} \longrightarrow DE: y = \frac{1}{2}x + 3 \\ AD: y = 2x \longrightarrow BE: y = 2x - 3 \end{array} \right\} \Rightarrow E(4, 5) \\ \left. \begin{array}{l} BD: y = -x + 6 \\ AE: y = x + 1 \end{array} \right\} \Rightarrow AE \perp BD \end{array}$$

$$\boxed{9-64} \quad \mathbf{a.} \ y = 2x + \dots \quad \mathbf{b.} \ y = -\frac{1}{2}x + \dots$$

$$\boxed{9-65} \quad \text{ja, nee}$$

$$\boxed{9-66} \quad (2, 3)$$

$$\boxed{9-67} \quad (3, 5)$$

$$\boxed{9-68} \quad \mathbf{a.} \ (2, -1)$$

$$\boxed{9-69} \quad l: y = -x + 5; m: y = \frac{1}{2}x + 3\frac{1}{2}; n: y = -2x - 4$$

$$\boxed{9-70} \quad l: y = 0, 3x + 7; m: y = -\frac{1}{10}x; n: y = \frac{1}{5}x + 2$$

$$\boxed{9-71} \quad m: y = 3x + 3; n: y = -x + 4$$

$$\boxed{9-72} \quad \text{rico}_k = 2; \text{rico}_l = -1; \text{rico}_m = 3;$$

$$\boxed{9-76} \quad A: \text{nee}; B: \text{ja}$$

$$\boxed{9-77} \quad P: \text{nee}; B: \text{ja}$$

$$\boxed{9-78} \quad \mathbf{a.} \ k: y = 6x + 19; \mathbf{b.} \ (-3\frac{1}{6}, 0); \mathbf{c.} \ (0, 19)$$

$$\boxed{9-79} \quad \mathbf{a.} \ m: y = -3x + 2; \mathbf{b.} \ (\frac{2}{3}, 0); \mathbf{c.} \ (0, 2)$$

$$\boxed{9-80} \quad k \cap m = (-2, 2) \text{ ligt niet op } l$$

$$\boxed{9-81} \quad k \cap l = (2, 3) \text{ ligt op } m$$

$$\boxed{9-82} \quad \mathbf{a.} \ y = -1\frac{1}{3}x + 5\frac{1}{3}; \mathbf{b.} \ y = -1\frac{1}{3}x - 4$$

$$\boxed{9-83} \quad AB: y = x; BC: y = 20; AC: y = -\frac{1}{3}x + 20; h_B: y = \frac{1}{3}x + 12\frac{1}{3}; h_A: x = 5; h_C: y = -x + 20; D(5, 20); E(2, 14); F(10, 10); H(5, 15); AH = 10; BH = 5\sqrt{10}; CH = 5\sqrt{2}; AE = 3\sqrt{10}; AF = 5\sqrt{2}; BF = 10\sqrt{2}; BD = 15; CD = 5; CE = 2\sqrt{10}; DH = 5; EH = \sqrt{10}; FH = 5\sqrt{2}; EB = 6\sqrt{10}; CF = 10\sqrt{2}; 150$$

$$\boxed{9-84} \quad AB: y = -\frac{1}{4}x + 12\frac{1}{2}; BC: y = 8x - 4; AC: y = \frac{7}{5}x - 4; D(6, 11); E(1, 4); F(5, 3); z_A: y = \frac{2}{3}x + 3\frac{1}{3}; z_B: y = -3x + 18; z_C: y = 2\frac{1}{2}x - 4; Z(4, 6); ED: y = \frac{7}{5}x + 2\frac{3}{5}; DF: y = 8x - 37; EF: y = -\frac{1}{4}x + 4\frac{1}{4}; AB = 2\sqrt{17}; AC = 2\sqrt{74}; BC = 2\sqrt{65}; DE = \sqrt{74}; EF = \sqrt{17}; DF = \sqrt{65}; 2:1; ZA = 2\sqrt{13}; ZB = 2\sqrt{10}; ZC = 2\sqrt{29}; ZD = \sqrt{29}; ZE = \sqrt{13}; ZF = \sqrt{10}; 2:1$$

$$\boxed{9-85} \quad AB: x = 10; BC = \frac{1}{7}x + 10\frac{4}{7}; AC: y = -x + 6; D(10, 4); E(3, 11); F(3, 3); m_a: y = -7x + 32; m_b: y = x; m_c: y = 4; M(4, 4); AM = BM = CM = 10$$

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- 10-1 E
- 10-2 C
- 10-3 C
- 10-4 E
- 10-5 C
- 10-6 A
- 10-7 E
- 10-8 B
- 10-9 B
- 10-10 E
- 10-11 B
- 10-12 E
- 10-13 B
- 10-14 D
- 10-15 E
- 10-16 A
- 10-17 C
- 10-18 C
- 10-19 B
- 10-20 B
- 10-21 C
- 10-22 A
- 10-23 E
- 10-24 B
- 10-25 C
- 10-26 C
- 10-27 D
- 10-28 D
- 10-29 E
- 10-30 C
- 10-31 D
- 10-32 B
- 10-33 C
- 10-34 B

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