

1.4 Stelsels vergelijkingen

Opgave 42:

- a. ja, $0 + 4 \cdot 3 = 12$
b. ja, $-\frac{1}{4} \cdot 4 + 3 = 2$
c. $y = -\frac{1}{4}x + 3$
 $\frac{1}{4}x + y = 3$
 $x + 4y = 12$

Opgave 43:

$l: 3x - y = 6$

x	0	2
y	-6	0

$m: x + y = 1$

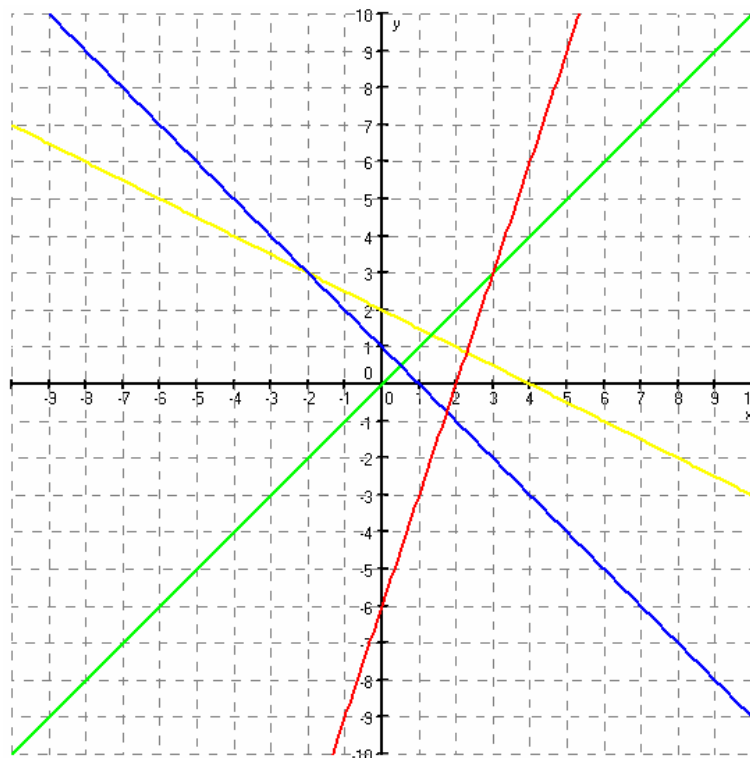
x	0	1
y	1	0

$n: x - y = 0$

x	0	1
y	0	1

$p: x + 2y = 4$

x	0	4
y	2	0



Opgave 44:

- a. x -as: $y = 0$
 $4x = 24$
 $x = 6$ dus $(6,0)$
 y -as: $x = 0$
 $-3y = 24$
 $y = -8$ dus $(0,-8)$
- b. $A: 4 \cdot 8 - 3 \cdot 3 = 23 \neq 24$ dus A ligt niet op l
 $B: 4 \cdot 18 - 3 \cdot 16 = 24$ dus B ligt wel op l
 $C: 4 \cdot -30 - 3 \cdot -48 = 24$ dus C ligt wel op l
- c. $4 \cdot 16 - 3p = 24$
 $64 - 3p = 24$
 $-3p = -40$
 $p = 13\frac{1}{3}$

d. $4q - 3 \cdot 48 = 24$
 $4q - 144 = 24$
 $4q = 168$
 $q = 42$

Opgave 45:

a. $l: 2x + y = 3$

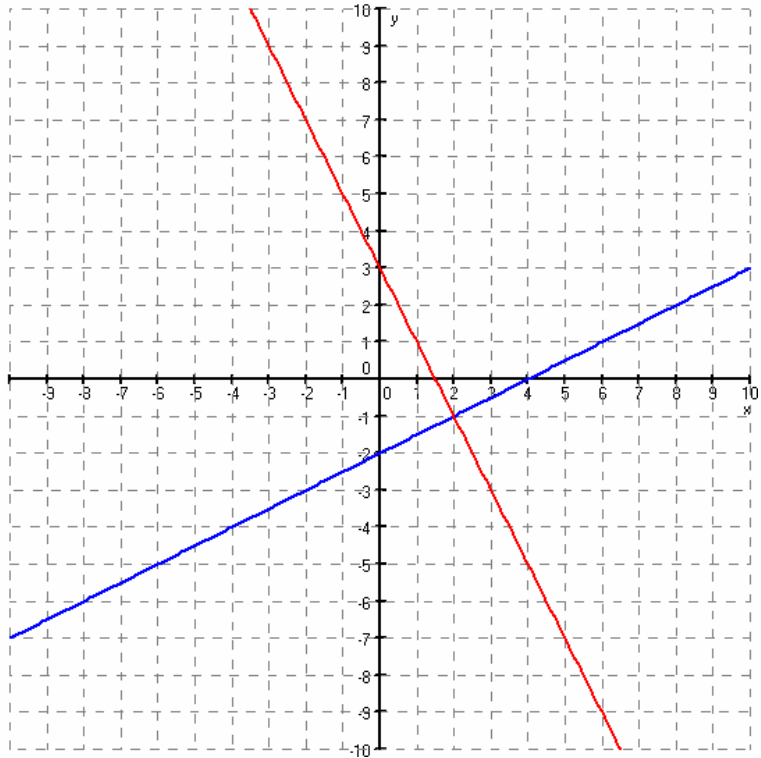
x	0	$1\frac{1}{2}$
y	3	0

$m: x - 2y = 4$

x	0	4
y	-2	0

b. $(2, -1)$

c. $x = 2 \wedge y = -1$



Opgave 46:

a.
$$\begin{cases} 5x - 4y = -8 \\ -x + 4y = -12 \end{cases} +$$

$$\hline 4x = -20$$

$x = -5$

$-25 - 4y = -8$

$-4y = 17$

$y = -4\frac{1}{4}$

$x = -5 \wedge y = -4\frac{1}{4}$

b.
$$\begin{cases} -2x + y = 7 \\ -2x + 3y = -1 \end{cases} -$$

$$\hline -2y = 8$$

$y = -4$

$-2x - 4 = 7$

$-2x = 11$

$x = -5\frac{1}{2}$

$x = -5\frac{1}{2} \wedge y = -4$

$$\begin{array}{l}
 \text{c. } \left\{ \begin{array}{l} -x - 3y = -8 \\ -2x + 3y = -1 \end{array} \right. + \\
 \hline
 -3x = -9 \\
 x = 3 \\
 -3 - 3y = -8 \\
 -3y = -5 \\
 y = \frac{5}{3} = 1\frac{2}{3} \\
 x = 3 \quad \wedge \quad y = 1\frac{2}{3}
 \end{array}$$

Opgave 47:

$$\text{a. } \left\{ \begin{array}{l} 3x - 4y = 7 \\ 2x + 3y = 16 \end{array} \right. + \\
 \hline
 5x - y = 23$$

nee

$$\text{b. } \left\{ \begin{array}{l} 3x - 4y = 7 \\ 2x + 3y = 16 \end{array} \right. - \\
 \hline
 x - 7y = -9$$

nee

Opgave 48:

$$\text{a. } \left\{ \begin{array}{l} 3x + 5y = -7 \\ 2x + y = 0 \end{array} \right. \begin{array}{l} | \times 1 \\ | \times 5 \end{array} \\
 \hline
 \left\{ \begin{array}{l} 3x + 5y = -7 \\ 10x + 5y = 0 \end{array} \right. - \\
 \hline
 -7x = -7$$

$$x = 1$$

$$3 + 5y = -7$$

$$5y = -10$$

$$y = -2$$

$$x = 1 \quad \wedge \quad y = -2$$

$$\text{b. } \left\{ \begin{array}{l} 2x - 4y = 6 \\ 3x - y = 19 \end{array} \right. \begin{array}{l} | \times 1 \\ | \times 4 \end{array} \\
 \hline
 \left\{ \begin{array}{l} 2x - 4y = 6 \\ 12x - 4y = 76 \end{array} \right. - \\
 \hline
 -10x = -70$$

$$x = 7$$

$$14 - 4y = 6$$

$$-4y = -8$$

$$y = 2$$

$$x = 7 \quad \wedge \quad y = 2$$

$$\begin{array}{l}
 \text{c.} \quad \left\{ \begin{array}{l} 4x + y = 13 \\ x - 2y = 1 \end{array} \right. \begin{array}{l} | \times 2 \\ | \times 1 \end{array} \\
 \left\{ \begin{array}{l} 8x + 2y = 26 \\ x - 2y = 1 \end{array} \right. + \\
 \hline
 9x = 27 \\
 x = 3 \\
 12 + y = 13 \\
 y = 1 \\
 x = 3 \quad \wedge \quad y = 1
 \end{array}$$

Opgave 49:

$$\begin{array}{l}
 \text{a.} \quad \left\{ \begin{array}{l} 5x + 2y = 69 \\ x + 3y = -7 \end{array} \right. \begin{array}{l} | \times 1 \\ | \times 5 \end{array} \\
 \left\{ \begin{array}{l} 5x + 2y = 69 \\ 5x + 15y = -35 \end{array} \right. - \\
 \hline
 -13y = 104 \\
 y = -8 \\
 x - 24 = -7 \\
 x = 17 \\
 x = 17 \quad \wedge \quad y = -8
 \end{array}$$

$$\begin{array}{l}
 \text{b.} \quad \left\{ \begin{array}{l} 2x - 5y = -19 \\ 5x + 4y = 35 \end{array} \right. \begin{array}{l} | \times 4 \\ | \times 5 \end{array} \\
 \left\{ \begin{array}{l} 8x - 20y = -78 \\ 25x + 20y = 175 \end{array} \right. + \\
 \hline
 33x = 99 \\
 x = 3 \\
 15 + 4y = 35 \\
 4y = 20 \\
 y = 5 \\
 x = 3 \quad \wedge \quad y = 5
 \end{array}$$

$$\begin{array}{l}
 \text{c.} \quad \left\{ \begin{array}{l} 0,8x + 0,2y = 1 \\ 0,3x - 0,3y = 1,5 \end{array} \right. \begin{array}{l} | \times 3 \\ | \times 2 \end{array} \\
 \left\{ \begin{array}{l} 2,4x + 0,6y = 3 \\ 0,6x - 0,6y = 3 \end{array} \right. + \\
 \hline
 3x = 6 \\
 x = 2 \\
 1,6 + 0,2y = 1 \\
 0,2y = -0,6 \\
 y = -3 \\
 x = 2 \quad \wedge \quad y = -3
 \end{array}$$

Opgave 50:

$$\begin{cases} 3x - 2y = -12 & | \times 2 \\ x + 4y = 38 & | \times 1 \end{cases}$$

$$\begin{cases} 6x - 4y = -24 \\ x + 4y = 38 \quad + \\ \hline 7x = 14 \end{cases}$$

$$x = 2$$

$$6 - 2y = -12$$

$$-2y = -18$$

$$y = 9$$

$$S = (2, 9)$$

Opgave 51:

a. $1^2 + b + c = -2$

$$b + c = -3$$

b. $2^2 + 2b + c = 3$

$$2b + c = -1$$

c. $\begin{cases} b + c = -3 \\ 2b + c = -1 \quad - \\ \hline -b = -2 \end{cases}$

$$b = 2$$

$$2 + c = -3$$

$$c = -5$$

$$b = 2 \quad \wedge \quad c = -5$$

Opgave 52:

$$\begin{cases} a + c = 8 \\ 4a + c = 17 \quad - \\ \hline -3a = -9 \end{cases}$$

$$a = 3$$

$$3 + c = 8$$

$$c = 5$$

$$a = 3 \quad \wedge \quad c = 5$$

$$y = 3x^2 + 5$$

Opgave 53:

$$\begin{cases} 2a + b = 8 & | \times 2 \\ 2b + a = 8 & | \times 1 \end{cases}$$

$$\begin{cases} 4a + 2b = 16 \\ a + 2b = 8 \quad - \\ \hline 3a = 8 \end{cases}$$

$$a = 2\frac{2}{3}$$

$$2\frac{2}{3} + 2b = 8$$

$$2b = 5\frac{1}{3}$$

$$b = 2\frac{2}{3}$$

$$a = 2\frac{2}{3} \quad \wedge \quad b = 2\frac{2}{3}$$

Opgave 54:

$$\text{a. } \begin{cases} 4 + 2p + q = -1 \\ 4p - q = -1 \end{cases} +$$

$$4 + 6p = -2$$

$$6p = -6$$

$$p = -1$$

$$4 - 2 + q = -1$$

$$q = -3$$

$$p = -1 \quad \wedge \quad q = -3$$

b. $y = x^2 - x - 3$ en $y = -2x + 3$

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

$$x^2 + x - 6 = 0$$

$$(x + 3)(x - 2) = 0$$

$$x = -3 \quad \vee \quad x = 2$$

$$y = 9 \quad \vee \quad y = -1$$

$$\text{dus } (-3, 9) \text{ en } (2, -1)$$

Opgave 55:

Door (0,4) dus $c = 4$

$$y = ax^2 + bx + 4$$

$$\begin{cases} 4a - 2b + 4 = -10 \\ 9a + 3b + 4 = 5 \end{cases}$$

$$\begin{cases} 4a - 2b = -14 & \times 3 \\ 9a + 3b = 1 & \times 2 \end{cases}$$

$$\begin{cases} 12a - 6b = -42 \\ 18a + 6b = 2 \end{cases} +$$

$$30a = -40$$

$$a = -1\frac{1}{3}$$

$$-5\frac{1}{3} - 2b + 4 = -10$$

$$-2b = -8\frac{2}{3}$$

$$b = 4\frac{1}{3}$$

$$y = -1\frac{1}{3}x^2 + 4\frac{1}{3}x + 4$$

Opgave 56:

$$\begin{cases} 2x + 3y = 12 \\ y = 4x - 10 \end{cases}$$

$$2x + 3(4x - 10) = 12$$

$$2x + 12x - 30 = 12$$

$$14x = 42$$

$$x = 3$$

$$y = 2$$

$$\text{dus } S = (3, 2)$$

Opgave 57:

a. $2x + 2y = 9 \quad \wedge \quad y = 4x - 3$

$$2x + 2(4x - 3) = 9$$

$$2x + 8x - 6 = 9$$

$$10x = 15$$

$$x = 1\frac{1}{2}$$

$$y = 3$$

$$\text{dus } x = 1\frac{1}{2} \quad \wedge \quad y = 3$$

b. $y = \frac{1}{2}x + 1 \quad \wedge \quad 3x + 6y = 8$

$$3x + 6(\frac{1}{2}x + 1) = 8$$

$$3x + 3x + 6 = 8$$

$$6x = 2$$

$$x = \frac{1}{3}$$

$$y = 1\frac{1}{6}$$

$$\text{dus } x = \frac{1}{3} \quad \wedge \quad y = 1\frac{1}{6}$$

c. $x = 5y - 3 \quad \wedge \quad 3x + 4y = 29$

$$3(5y - 3) + 4y = 29$$

$$15y - 9 + 4y = 29$$

$$19y = 38$$

$$y = 2$$

$$x = 7$$

$$\text{dus } x = 7 \quad \wedge \quad y = 2$$

Opgave 58:

a.
$$\begin{cases} y = x^2 - 3 \\ x - y = -3 \end{cases}$$

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

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

$$-x^2 + x + 6 = 0$$

$$x^2 - x - 6 = 0$$

$$(x - 3)(x + 2) = 0$$

$$x = 3 \quad \vee \quad x = -2$$

$$y = 6 \quad \vee \quad y = 1$$

$$\text{dus } (x = 3 \quad \wedge \quad y = 6) \quad \vee \quad (x = -2 \quad \wedge \quad y = 1)$$

$$\begin{aligned}
\text{b. } & \begin{cases} x^2 + y^2 = 25 \\ 3x + y = 5 \end{cases} \\
& \begin{cases} x^2 + y^2 = 25 \\ y = -3x + 5 \end{cases} \\
& x^2 + (-3x + 5)^2 = 25 \\
& x^2 + 9x^2 - 30x + 25 = 25 \\
& 10x^2 - 30x = 0 \\
& 10x(x - 3) = 0 \\
& x = 0 \quad \vee \quad x = 3 \\
& y = 5 \quad \vee \quad y = -4 \\
& \text{dus } (x = 0 \wedge y = 5) \vee (x = 3 \wedge y = -4)
\end{aligned}$$

$$\begin{aligned}
\text{c. } & \begin{cases} x^2 + y^2 = 20 \\ xy = 8 \end{cases} \\
& \begin{cases} x^2 + y^2 = 20 \\ y = \frac{8}{x} \end{cases} \\
& x^2 + \left(\frac{8}{x}\right)^2 = 20 \\
& x^2 + \frac{64}{x^2} = 20 \\
& x^4 + 64 = 20x^2 \\
& x^4 - 20x^2 + 64 = 0 \\
& \text{stel } x^2 = p \\
& p^2 - 20p + 64 = 0 \\
& (p - 4)(p - 16) = 0 \\
& p = 4 \quad \vee \quad p = 16 \\
& x^2 = 4 \quad \vee \quad x^2 = 16 \\
& x = 2 \quad \vee \quad x = -2 \quad \vee \quad x = 4 \quad \vee \quad x = -4 \\
& y = 4 \quad \vee \quad y = -4 \quad \vee \quad y = 2 \quad \vee \quad y = -2 \\
& \text{dus } (x = 2 \wedge y = 4) \vee (x = -2 \wedge y = -4) \vee (x = 4 \wedge y = 2) \vee \\
& \quad (x = -4 \wedge y = -2)
\end{aligned}$$