

GELYKTYDIGE VERGELYKINGS: ALGEBRAÏESE OPLOSSING*

Free High School Science Texts Project

Based on *Simultaneous equations: algebraic solution*[†] by

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1 Algebraïese oplossings

Die oplos van gelyktydige vergelykings in algebra is deur middel van substitusie
Byvoorbeeld die oplossing van

$$\begin{aligned}y - 2x &= -4 \\ x^2 + y &= 4\end{aligned}\tag{1}$$

is:

$$\begin{aligned}y &= 2x - 4 \quad \text{in tweede vergelyking} \\ x^2 + (2x - 4) &= 4 \\ x^2 + 2x - 8 &= 0\end{aligned}\tag{2}$$

$$\text{Faktoriseer : } (x + 4)(x - 2) = 0$$

∴ Die 2 oplossings vir x is : $x = -4$ en $x = 2$

Die ooreenstemmende oplossings vir y word verkry deur substitusie van die x -waardes in die eerste vergelyking

$$\begin{aligned}y &= 2(-4) - 4 = -12 \quad \text{vir } x = -4 \\ \text{en : } y &= 2(2) - 4 = 0 \quad \text{vir } x = 2\end{aligned}\tag{3}$$

Soos verwag, is hierdie oplossings identies aan die waardes verkry deur die grafiese oplossing

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Oefening 1: Gelyktydige vergelykings

Los op algebraïes:

(Solution on p. 3.)

$$\begin{aligned}y - x^2 + 9 &= 0 \\y + 3x - 9 &= 0\end{aligned}\tag{4}$$

1.1 Algebraïese oplossing

Los op die volgende probleme van algebraïese vergelykings. Waar toepaslik, los jou antwoord in wortelvorm.

1. $a + b = 5$	$a - b^2 + 3b - 5 = 0$
2. $a - b + 1 = 0$	$a - b^2 + 5b - 6 = 0$
3. $a - \frac{(2b+2)}{4} = 0$	$a - 2b^2 + 3b + 5 = 0$
4. $a + 2b - 4 = 0$	$a - 2b^2 - 5b + 3 = 0$
5. $a - 2 + 3b = 0$	$a - 9 + b^2 = 0$
6. $a - b - 5 = 0$	$a - b^2 = 0$
7. $a - b - 4 = 0$	$a + 2b^2 - 12 = 0$
8. $a + b - 9 = 0$	$a + b^2 - 18 = 0$
9. $a - 3b + 5 = 0$	$a + b^2 - 4b = 0$
10. $a + b - 5 = 0$	$a - b^2 + 1 = 0$
11. $a - 2b - 3 = 0$	$a - 3b^2 + 4 = 0$
12. $a - 2b = 0$	$a - b^2 - 2b + 3 = 0$
13. $a - 3b = 0$	$a - b^2 + 4 = 0$
14. $a - 2b - 10 = 0$	$a - b^2 - 5b = 0$
15. $a - 3b - 1 = 0$	$a - 2b^2 - b + 3 = 0$
16. $a - 3b + 1 = 0$	$a - b^2 = 0$
17. $a + 6b - 5 = 0$	$a - b^2 - 8 = 0$
18. $a - 2b + 1 = 0$	$a - 2b^2 - 12b + 4 = 0$
19. $2a + b - 2 = 0$	$8a + b^2 - 8 = 0$
20. $a + 4b - 19 = 0$	$8a + 5b^2 - 101 = 0$
21. $a + 4b - 18 = 0$	$2a + 5b^2 - 57 = 0$

Table 1

Solutions to Exercises in this Module

Oplossing to Exercise (p. 1)

Step 1.

$$\begin{aligned}y + 3x - 9 &= 0 \\y &= -3x + 9\end{aligned}\tag{5}$$

Step 2.

$$\begin{aligned}(-3x + 9) - x^2 + 9 &= 0 \\x^2 + 3x - 18 &= 0 \\ \text{Faktoriseer : } (x + 6)(x - 3) &= 0 \\ \therefore \text{ die 2 oplossings vir } x \text{ is : } x = -6 \text{ and } x = 3\end{aligned}\tag{6}$$

Step 3.

$$\begin{aligned}y = -3(-6) + 9 &= 27 \quad \text{vir } x = -6 \\ \text{en : } y = -3(3) + 9 &= 0 \quad \text{vir } x = 3\end{aligned}\tag{7}$$

Step 4. Die eerste waarde is $x = -6$ en $y = 27$. Die tweede waarde is $x = 3$ en $y = 0$.