

Letterrekenen

Haakjes wegwerken uitwerkingen

Voorbeelden:

$$\begin{aligned}5(4a + 3) &= 5 \times 4a + 5 \times 3 \\ &= 20a + 15\end{aligned}$$

$$\begin{aligned}5a(4a + 3) &= 5a \times 4a + 5a \times 3 \\ &= 20a^2 + 15a\end{aligned}$$

$$\begin{aligned}(a + 7)(b - 8) &= a \times b + a \times -8 + 7 \times b + 7 \times -8 \\ &= ab - 8a + 7b - 56\end{aligned}$$

$$\begin{aligned}(a + 4)^2 &= (a + 4)(a + 4) \\ &= a \times a + a \times 4 + 4 \times a + 4 \times 4 \\ &= a^2 + 4a + 4a + 16 \\ &= a^2 + 8a + 16\end{aligned}$$

Opgave 4.1

Herleid.

- a) $-5(3a - 2b) = -15a + 10b$
- b) $3(2a + 3b) = 6a + 9b$
- c) $-7(x + 2y) = -7x - 14y$
- d) $19(2q + 1) = 38q + 19$

- e) $y(4x - 3a) = 4xy - 3ay$
- f) $x(3a - 9b) = 3ax - 9bx$
- g) $-a(2a + y) = -2a^2 - ay$
- h) $-b(10p - 3q) = -10bp + 3bq$

Opgave 4.2

Herleid.

- a) $2a(4 + 3a) = 8a + 6a^2$
- b) $-7q(5a - 4q) = -35aq + 28q^2$
- c) $5a(4y + 4x) = 20ay + 20ax$
- d) $-(11a + 3b) = -11a - 3b$

- e) $-2a(a + 3a) = -2a^2 - 6a^2$
- f) $9y(3p + 8y) = 27py + 72y^2$
- g) $-5a(-3a - 9p) = 15a^2 + 45ap$
- h) $-x(3a + 5b) = -3ax - 5bx$

Opgave 4.3

Herleid.

- a) $5a(3 + 5x^2) = 15a + 25ax^2$
- b) $-(x^2 + y) = -x^2 - y$
- c) $4a(7b + 12a^4) = 28ab + 48a^5$
- d) $-y^3(x - 7a) = -xy^3 + 7ay^3$

- e) $7a(7b^7 + 7p) = 49ab^7 + 49ap$
- f) $-5x(y^2 - 9x) = -5xy^2 + 45x^2$
- g) $-9a(3a + 7b) = -27a^2 - 63ab$
- h) $-(14x^3 - 13a) = -14x^3 + 13a$

Opgave 4.4

Herleid.

- a) $6(2a + 2b) + 2(b - 3y) = 12a + 12b + 2b - 6y = 12a + 14b - 6y$
- b) $5(3a + 6b) - 3(5a + 3b) = 15a + 30b - 15a - 9b = 21b$
- c) $6(2a^2 - 7b) - 3a^2(4 + 4b) = 12a^2 - 42b - 12a^2 - 12a^2b = -42b - 12a^2b$
- d) $4y(8y^4 + 6) - 5y^4(x - 8y) = 32y^5 + 24y - 5y^4x + 40y^5 = 72y^5 + 24y - 5y^4x$
- e) $2p^3(4p - 5b^7) + 8p^3(4p + 7b^7) = 8p^4 - 10b^7p^3 + 32p^4 + 56b^7p^3 = 40p^4 + 46b^7p^3$
- f) $x(3x + 9y) + 6x(10x + 11y) = 3x^2 + 9xy + 60x^2 + 66xy = 63x^2 + 75xy$
- g) $y(8y^2 + 2) - 4y^2(x - 6y) = 8y^3 + 2y - 4xy^2 + 24y^3 = 32y^3 + 2y - 4xy^2$
- h) $4b^2(9y - 6b^3) - 5b^2(b^3 - 9y) = 36b^2y - 24b^5 - 5b^5 + 45b^2y = 81b^2y - 29b^5$

Opgave 4.5

Herleid.

- a) $(a + 7)(b + 9) = ab + 9a + 7b + 63$
- b) $(q + 4)(q + 5) = q^2 + 5q + 4q + 20 = q^2 + 9q + 20$
- c) $(p - 2)(p + 3) = p^2 + 3p - 2p - 6 = p^2 + p - 6$
- d) $(x - 6)(y - 2) = xy - 2x - 6y + 12 = xy - 8xy + 12$
- e) $(p - 3)(y + 5) = py + 5p - 3y - 15$
- f) $(y + 2)(y + 11) = y^2 + 11y + 2y + 22 = y^2 + 13y + 22$
- g) $(x + 5)(p - 9) = px - 9x + 5p - 45$
- h) $(a - 3)(a - 11) = a^2 - 11a - 3a + 33 = a^2 - 14a + 33$

Opgave 4.6

Herleid.

- a) $(a + 5)(a - 12) = a^2 - 12a + 5a - 60 = a^2 - 7a - 60$
- b) $(b - 7)(b - 8) = b^2 - 8b - 7b + 56 = b^2 - 15b + 56$
- c) $(y + 13)(y + 3) = y^2 + 3y + 13y + 39 = y^2 + 16y + 39$
- d) $(a + 4)(a - 4) = a^2 - 4a + 4a - 16 = a^2 - 16$
- e) $(y + 7)(y - 7) = y^2 - 7y + 7y - 49 = y^2 - 49$
- f) $(x + 6)(x - 6) = x^2 - 6x + 6x - 36 = x^2 - 36$
- g) $(x + 4)(x - 7) = x^2 - 7x + 4x - 28 = x^2 - 3x - 28$
- h) $(a + p)(b + q) = ab + aq + bp + pq$

Opgave 4.7

Herleid.

- a) $(a + 7)^2 = (a + 7)(a + 7) = a^2 + 7a + 7a + 49 = a^2 + 14a + 49$
- b) $(q - 5)^2 = (q - 5)(q - 5) = q^2 - 5q - 5q + 25 = q^2 - 10q + 25$
- c) $(p + 2)^2 = (p + 2)(p + 2) = p^2 + 2p + 2p + 4 = p^2 + 4p + 4$
- d) $(a + b)^2 = (a + b)(a + b) = a^2 + ab + ab + b^2 = a^2 + 2ab + b^2$
- e) $(x - 10)^2 = (x - 10)(x - 10) = x^2 - 10x - 10x + 100 = x^2 - 20x + 100$
- f) $(x - 6)^2 = (x - 6)(x - 6) = x^2 - 6x - 6x + 36 = x^2 - 12x + 36$
- g) $(y - 8)^2 = (y - 8)(y - 8) = y^2 - 8y - 8y + 64 = y^2 - 16y + 64$
- h) $(u + 4)^2 = (u + 4)(u + 4) = u^2 + 4u + 4u + 16 = u^2 + 8u + 16$

Opgave 4.8

Herleid.

- a) $(2a + 5)(3a - 3) = 6a^2 - 6a + 15a - 15 = 6a^2 + 9a - 15$
- b) $(2b - 4)(3a - 5) = 6ab - 10b - 12a + 20$
- c) $(4 - 2a)(3a + 9) = 12 + 36 - 6a^2 - 18a = 48 - 6a^2 - 18a$
- d) $(5a - 3)(3 - 5y) = 15a - 25ay - 9 + 15y$
- e) $(2a - 3)^2 = (2a - 3)(2a - 3) = 4a^2 - 6a - 6a + 9 = 4a^2 - 12a + 9$
- f) $(3 - 2a)^2 = (3 - 2a)(3 - 2a) = 9 - 6a - 6a - 4a^2 = 9 - 12a - 4a^2$
- g) $(3a - 7)(3a + 7) = 9a^2 + 21a - 21a - 49 = 9a^2 - 49$
- h) $(4a - 5b)^2 = (4a - 5b)(4a - 5b) = 16a^2 - 20ab - 20ab + 25b^2 = 16a^2 - 40ab + 25b^2$

Opgave 4.9

Herleid.

$$a) (2a - 3)(3a^7 - 4) = 6a^8 - 8a - 9a^7 + 12$$

$$b) (3b^2 + 4)^2 = (3b^2 + 4)(3b^2 + 4) = 9b^4 + 12b^2 + 12b^2 + 16 = 9b^4 + 24b^2 + 16$$

$$c) (3a^4 - 4)(3a^4 + 4) = 9a^8 + 12a^4 - 12a^4 - 16 = 9a^8 - 16$$

$$d) (4 - 3b^4)(3a + 6) = 12a + 24 - 9ab^4 - 18b^4$$

$$e) (4 - 3b^5)^2 = (4 - 3b^5)(4 - 3b^5) = 16 - 12b^5 - 12b^5 + 9b^{10} = 16 - 24b^5 + 9b^{10}$$

$$f) (2a - 10)^2 = (2a - 10)(2a - 10) = 4a^2 - 20a - 20a + 100 = 4a^2 - 40a + 100$$

$$g) (3 + 4a)(5a^2 + 3) = 15a^2 + 9 + 20a^3 + 12a$$

$$h) (3 - 6a)(5 - 7a^3) = 15 - 21a^3 - 30a + 42a^4$$

Opgave 4.10

Herleid.

$$a) (7a + 8b)^2 = (7a + 8b)(7a + 8b) = 49a^2 + 56ab + 56ab + 64b^2 = 49a^2 + 112ab + 64b^2$$

$$b) (5a - 7q)(5a^4 - 7q^4) = 25a^5 - 35aq^4 - 35a^4q + 49q^5$$

$$c) (6a - 9)(6a + 9) = 36a^2 + 54a - 54a - 81 = 36a^2 - 81$$

$$d) (5q^{11} - 4)^2 = (5q^{11} - 4)(5q^{11} - 4) = 25q^{22} - 20q^{11} - 20q^{11} + 16 = 25q^{22} - 40q^{11} + 16$$

$$e) (3 - 10y^4)(3 - 10y^4) = 9 - 30y^4 - 30y^4 + 100y^8 = 9 - 60y^4 + 100y^8$$

$$f) (7x^9 + 11)(7x^9 - 11) = 49x^{18} - 77x^9 + 77x^9 - 121 = 49x^{18} - 121$$

$$g) (4a^5 - 5b^7)^2 = (4a^5 - 5b^7)(4a^5 - 5b^7) = 16a^{10} - 20a^5b^7 - 20a^5b^7 + 25b^{14} \\ = 16a^{10} - 40a^5b^7 + 25b^{14}$$

$$h) (5y^6 - 5)(5y^6 + 5) = 25y^{12} + 25y^6 - 25y^6 - 25 = 25y^{12} - 25$$