Diagnostische toets

bladzijde 74

1 a $6x^2 + 9x = 3x(2x + 3)$
b $8pq + 5p = p(8q + 5)$
c $5x^2 - x = x(5x - 1)$
d $10a^2b + 15ab = 5ab(2a + 3)$

2 a $36x^2 - 24xy = 12x(3x - 2y)$
b $9x^2 - 121 = (3x - 11)(3x + 11)$
c $5x^2y + xy - 2xy^2 = xy(5x + 1 - 2y)$
d $12x^3 - 48x = 12x(x^2 - 4) = 12x(x - 2)(x + 2)$

3 a $x^2 + 10x + 21 = (x + 3)(x + 7)$
b $x^2 + 10x - 24 = (x - 2)(x + 12)$
c $3x^2 - 4x = x(3x - 4)$
d $x^2 - 4x - 32 = (x - 8)(x + 4)$
e $x^2 + x - 56 = (x - 7)(x + 8)$
f $3x^3 + 12x^2 - 15x = 3x(x^2 + 4x - 5) = 3x(x + 5)(x - 1)$

4 a $(x - 7)(x + 8) = 0$
$x - 7 = 0$ of $x + 8 = 0$
$x = 7$ of $x = -8$
b $-5x(2x + 3) = 0$
$-5x = 0$ of $2x + 3 = 0$
$x = 0$ of $2x = -3$
$x = 0$ $x = -1\frac{1}{2}$
c $(3x + 8)(x - 8) = 0$
$3x + 8 = 0$ of $x - 8 = 0$
$3x = -8$ of $x = 8$
$x = -\frac{8}{3}$ of $x = 8$
d $3x(8x - 3) = 0$
$3x = 0$ of $8x - 3 = 0$
$x = 0$ of $8x = 3$
$x = 0$ of $x = \frac{3}{8}$

5 a $x^2 + 9x + 14 = 0$
$(x + 2)(x + 7) = 0$
$x + 2 = 0$ of $x + 7 = 0$
$x = -2$ of $x = -7$
b $x^2 - 6x = 0$
$x(x - 6) = 0$
$x = 0$ of $x = -6$
$x = 0$ of $x = 6$
c $x^2 - 5x - 14 = 0$
$(x + 2)(x - 7) = 0$
$x + 2 = 0$ of $x - 7 = 0$
$x = -2$ of $x = 7$
d $5x^2 - 20x = 0$
$5x(x - 4) = 0$
$5x = 0$ of $x - 4 = 0$
$x = 0$ of $x = 4$
e $3x^2 + x = 0$
$x(3x + 1) = 0$
$x = 0$ of $3x + 1 = 0$
$x = 0$ of $3x = -1$
$x = 0$ of $x = -\frac{1}{3}$
f $x^2 - x - 30 = 0$
$(x + 5)(x - 6) = 0$
$x + 5 = 0$ of $x - 6 = 0$
$x = -5$ of $x = 6$

6 a $x^2 - 7x = 8$

-8 -8

$x^2 - 7x - 8 = 0$

$(x+1)(x-8) = 0$

$x+1=0$ of $x-8=0$

$x=-1$ of $x=8$

b $x^2 = 7x$

$-7x$ $-7x$

$x^2 - 7x = 0$

$x(x-7) = 0$

$x=0$ of $x-7=0$

$x=0$ of $x=7$

c $x^2 = 4x+5$

-5 -5

$x^2 - 5 = 4x$

$-4x$ $-4x$

$x^2 - 4x - 5 = 0$

$(x+1)(x-5) = 0$

$x+1=0$ of $x-5=0$

$x=-1$ of $x=5$

d $x^2 - x = 2x$

$-2x$ $-2x$

$x^2 - 3x = 0$

$x(x-3) = 0$

$x=0$ of $x-3=0$

$x=0$ of $x=3$

e $(3x-1)(x+5)=0$

$3x-1=0$ of $x+5=0$

$3x=1$ of $x=-5$

$x=\frac{1}{3}$ of $x=-5$

f $x^2 + 7x + 6 = 2x + 6$

-6 -6

$x^2 + 7x = 2x$

$-2x$ $-2x$

$x^2 + 5x = 0$

$x(x+5) = 0$

$x=0$ of $x+5=0$

$x=0$ of $x=-5$

7 a $x(x-2) = 8$

$x^2 - 2x = 8$

-8 -8

$x^2 - 2x - 8 = 0$

$(x+2)(x-4) = 0$

$x+2=0$ of $x-4=0$

$x=-2$ of $x=4$

b $(x-1)(x+4) = 36$

$x^2 + 4x - x - 4 = 36$

$x^2 + 3x - 4 = 36$

-36 -36

$x^2 + 3x - 40 = 0$

$(x-5)(x+8) = 0$

$x-5=0$ of $x+8=0$

$x=5$ of $x=-8$

c $(x-5)^2 = 16x$

$x^2 - 10x + 25 = 16x$

$-16x$ $-16x$

$x^2 - 26x + 25 = 0$

$(x-1)(x-25) = 0$

$x-1=0$ of $x-25=0$

$x=1$ of $x=25$

d $(x+5)(x+12) = 78$

$x^2 + 12x + 5x + 60 = 78$

$x^2 + 17x + 60 = 78$

-78 -78

$x^2 + 17x - 18 = 0$

$(x-1)(x+18) = 0$

$x-1=0$ of $x+18=0$

$x=1$ of $x=-18$

e $5x^2 - 20x = 60$

-60 -60

$5x^2 - 20x - 60 = 0$ alle termen : 5

$x^2 - 4x - 12 = 0$

$(x-6)(x+2) = 0$

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

$x=6$ of $x=-2$

f $(x+3)^2 + (x-1)^2 = 40$

$x^2 + 3x + 3x + 9 + x^2 - x - x + 1 = 40$

$2x^2 + 4x + 10 = 40$

-40 -40

$2x^2 + 4x - 30 = 0$ alle termen : 2

$x^2 + 2x - 15 = 0$

$(x+5)(x-3) = 0$

$x+5=0$ of $x-3=0$

$x=-5$ of $x=3$

8 a $(18+2x)(6+2x)-6\cdot 18=180$

b $108+36x+12x+4x^2-108=180$

$4x^2+48x = 180$

-180 -180

$4x^2+48x-180 = 0$ alle termen : 4

$x^2+12x-45=0$

$(x+15)(x-3)=0$

$x+15=0$ of $x-3=0$

$x=-15$ of $x=3$

c Omdat een breedte niet negatief kan zijn is -15 geen goede oplossing.
Het pad is dus 3 m breed.

bladzijde 75

9 a $6x^2-5 = 1$

$+5$ $+5$

$6x^2 = 6$

$:6$ $:6$

$x^2 = 1$

$x=1$ of $x=-1$

b $x^2-13 = 0$

$+13$ $+13$

$x^2 = 13$

$x=\sqrt{13}\approx 3{,}61$ of $x=\sqrt{13}\approx -3{,}61$

c $5x^2+1 = 0$

-1 -1

$5x^2 = -1$

$:5$ $:5$

$x = -0{,}2$

geen oplossingen

d $0{,}25x^2-1 = 15$

$+1$ $+1$

$0{,}25x^2 = 16$

$:0{,}25$ $:0{,}25$

$x^2 = 64$

$x=8$ of $x=-8$

e $25-x^2 = 16$

-25 -25

$-x^2 = -9$

$:-1$ $:-1$

$x^2 = 9$

$x=3$ of $x=-3$

f $5x^2+12 = 12$

-12 -12

$5x^2 = 0$

$:5$ $:5$

$x^2 = 0$

$x = 0$

10 a $2(x-3)^2+5 = 7$

-5 -5

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

$:2$ $:2$

$(x-3)^2 = 1$

$x-3=1$ of $x-3=-1$

$x=4$ of $x=2$

b $\frac{1}{5}(x+1)^2-1 = 4$

$+1$ $+1$

$\frac{1}{5}(x+1)^2 = 5$

$\times 5$ $\times 5$

$(x+1)^2 = 25$

$x+1=5$ of $x+1=-5$

$x=4$ of $x=-6$

11

$$\begin{aligned} 5-x^2 &= -x+3 \\ \boxed{+x} & \quad \boxed{+x} \\ 5-x^2+x &= 3 \\ \boxed{-3} & \quad \boxed{-3} \\ -x^2+x+2 &= 0 \\ \boxed{:-1} & \quad \boxed{:-1} \\ x^2-x-2 &= 0 \\ (x+1)(x-2) &= 0 \end{aligned}$$

$x+1=0$ of $x-2=0$

$x=-1$ of $x=2$

Bij $x=-1$ hoort $y=--1+3=4$, dus $A(-1,4)$.

Bij $x=2$ hoort $y=-2+3=1$, dus $B(2,1)$.

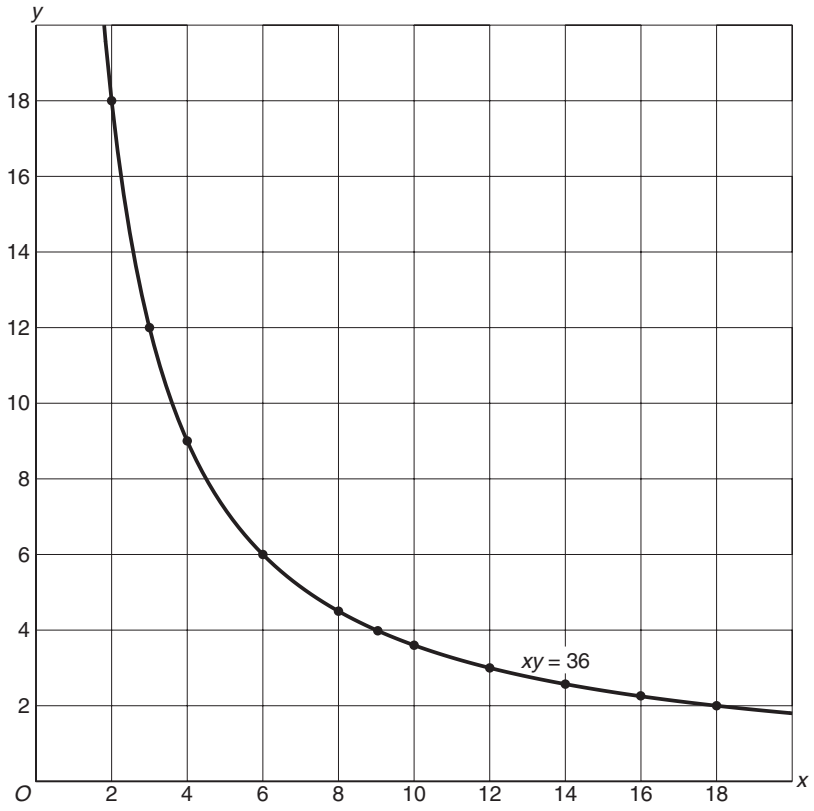
12 a $xy=36$

$$x=\frac{36}{y}$$

$$y=\frac{36}{x}$$

b

x	2	3	4	6	8	9	10	12	18
y	18	12	9	6	4,5	4	3,6	3	2



c Als x heel klein is, dan is y heel groot.
Als x bijvoorbeeld 0,0001 is, dan is $y=360\,000$

d Stel de breedte $= x$, dan is de lengte $= 4x$

opp (tuin) $= 4x \cdot x = 4x^2$

$4x^2 = 36$

$\boxed{:4}$ $\boxed{:4}$

$x^2 = 9$

$x = 3$ of $x = -3$

De tuin is $4 \cdot 3 = 12$ m lang en 3 m breed.

e Stel de breedte $= x$, dan is de lengte $= x + 9$

opp (tuin) $= x(x + 9) = x^2 + 9x$

$x^2 + 9x = 36$

$\boxed{-36}$ $\boxed{-36}$

$x^2 + 9x - 36 = 0$

$(x - 3)(x + 12) = 0$

$x - 3 = 0$ of $x + 12 = 0$

$x = 3$ of $x = -12$

De tuin is $3 + 9 = 12$ m lang en 3 m breed.