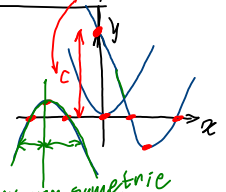
2e graad vgl

1e → $y = ax + b$ → $y = ax^1 + bx^0$

2e → $y = ax^2 + bx^1 + cx^0$

$y = ax^2 + bx + c$ ← $a \neq 0$



10.1

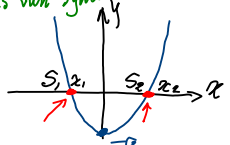
$x^2 = g$

$x^2 - g = 0$

I

$y = x^2 - g$

$y = 0$ → $x^2 - g = 0$



$(x+3)(x-3) = 0 \Rightarrow \begin{cases} x_1 + 3 = 0 \Rightarrow x_1 = -3 \rightarrow S_1(-3,0) \\ x_2 - 3 = 0 \Rightarrow x_2 = +3 \rightarrow S_2(+3,0) \end{cases}$

II

$x^2 = g$

$\sqrt{x^2} = \pm\sqrt{g}$

$x = \pm 3$

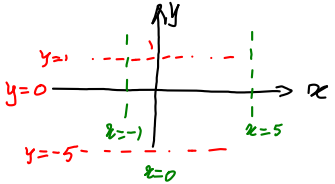
10.5.2. $(x+1)(x-5)=0 \Rightarrow$ $\underset{=0}{(x+1)}$ $\underset{=0}{(x-5)}$

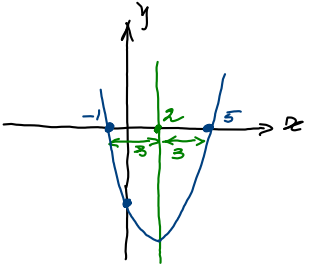
$x+1=0 \Rightarrow x_1=-1$

$x-5=0 \Rightarrow x_2=5$

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

snijpunt y-as.





Bepalen 0-punten = snijp. x-as | y=0

ontbinden in factoren | abc formule | kwadraat afsplitsen

Ontbinden in factoren

Stel $(x-3)(x+8) = x^2+5x-24$

p q

$p+q=5$

$p*q=-24$

$24 = 2^3 \cdot 3$

Stel $p = 2*2 = 4$

$q = 2*3*1 = 6$

$5 \quad -24$

$\pm 4 \quad \pm 6$

$+4 * (+6)$ ← kunnen we geen 5 van maken

Stel $p = 2^3 = 8$

$q = 3*1 = 3$

$\pm 3 \quad \pm 8 \quad +5 \quad -24$

$+3 \quad +8 \quad +11 \quad +24$

$+3 \quad -8 \quad -5 \quad -24$

$-3 \quad +8 \quad +5 \quad -24$

Conclusie $x^2+5x-24 = (x-3)(x+8)$

$y = x^2 + 4x - 5$

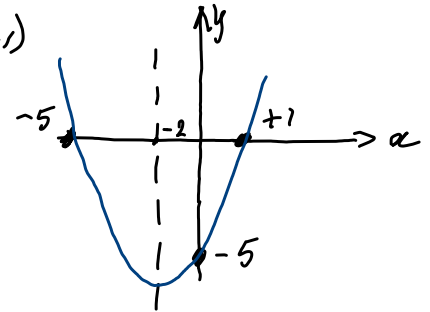
$5 \quad 5$

$1 \quad 1$

1

$\pm 5 \pm 1 \rightarrow +5 \quad -1$

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



$x^2 - 9x + 20$

$-4 \quad -5$

abc formule

$y = ax^2 + bx + c$

$y = x^2 - 8x - 26$

(I) $D = b^2 - 4ac$

↑ discriminant

$a = 1$
$b = -8$
$c = -26$

$\rightarrow D = (-8)^2 - 4 \cdot 1 \cdot (-26)$

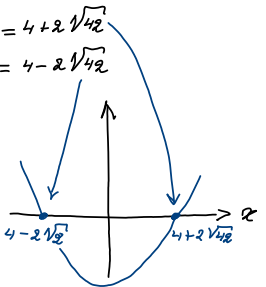
$= 64 + 104$

$D = 168$

(II) $x_{1,2} = \frac{-b \pm \sqrt{D}}{2a}$

$x_{1,2} = \frac{-(-8) \pm \sqrt{168}}{2 \cdot 1} \Rightarrow \begin{cases} x_1 = \frac{+8 + 4\sqrt{42}}{2} = 4 + 2\sqrt{42} \\ x_2 = \frac{+8 - 4\sqrt{42}}{2} = 4 - 2\sqrt{42} \end{cases}$

$y = \left(x - (4 + 2\sqrt{42})\right)\left(x - (4 - 2\sqrt{42})\right)$



$x^2+20x+60=0$

$a=1$
$b=20$
$c=60$

$D=20^2-4\cdot1\cdot60$
$=400-240$
$D=160$

$160 = 4\cdot40$

$x_{1,2}=\frac{-20\pm\sqrt{160}}{2\cdot1}$

$=\frac{-20\pm\sqrt{2^4\cdot10}}{2}=\frac{-20\pm2^2\sqrt{10}}{2}$

$=\frac{2(-10\pm2\sqrt{10})}{2}$

$=-10\pm2\sqrt{10}$

10 g.b.

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

$3\xrightarrow{3^2}9$

$y=x^2+6x+9-9-2$

$y=(x+3)^2-11 \Rightarrow Top(-3,-11)$

Snijp. met met x-as $\Rightarrow y=0$

$(x+3)^2-11=0$

Methode kort

$(x+3)^2=11$

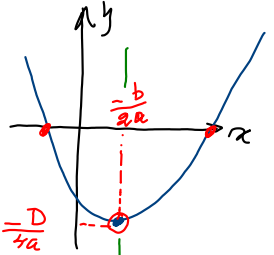
$\sqrt{(x+3)^2}=\pm\sqrt{11}$

$x+3=\pm\sqrt{11}$

$x=-3\pm\sqrt{11} \Rightarrow \begin{cases} x_1=-3+\sqrt{11} \\ x_2=-3-\sqrt{11} \end{cases}$

$y = ax^2 + bx + c$

	$D<0$	$D=0$	$D>0$
DAL $a>0$			
$a<0$			



$y = x^2 + 20x + 60$

as van symetrie

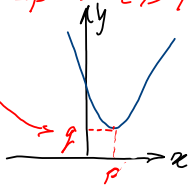
$x_{top} = \frac{-b}{2a} = \frac{-20}{2 \cdot 1} = -10$ $x = -\frac{b}{2a}$

$y_{top} = -\frac{D}{4a} = -\frac{160}{4 \cdot 1} = -\frac{160}{4} = -40$

Kwadraat afsplitsen

$y = a(x-p)^2 + q$ $\quad -p \rightarrow -(-p) = p$

$y = ax^2 + bx + c$



Vb

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

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

2 kwadraterey (4)

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

$(a \pm b)^2 = a^2 \pm 2ab + b^2$ merkw. Prod.

$y = (x+2)^2 - 40 \Rightarrow Top(-2, -40)$

$A^2 - 40 = (A + \sqrt{40})(A - \sqrt{40})$

$A^2 - B^2 = (A+B)(A-B)$

$(x + 2 + \sqrt{40})(x + 2 - \sqrt{40}) = 0 \Rightarrow \begin{cases} x_1 = -2 - \sqrt{40} = -2 - 2\sqrt{10} \\ x_2 = -2 + \sqrt{40} = -2 + 2\sqrt{10} \end{cases}$

$y = x^2 + 8x + 3$

$*\frac{1}{2}$ ↓ $4 \xrightarrow{\ ^2\ } 16$

$y = x^2 + 8x + 16 \quad -16 + 3$

$= (x+4)^2 - 13$

welk merkw. product zie je?

$(a \pm b)^2 = a^2 \pm 2ab + b^2$

$(x+4)^2 = (x+4)(x+4) = x^2 + 2 \cdot 1 \cdot 4x + 4^2$

$= x^2 + 8x + 16$

$x^2 + 4x + 1$

$*\frac{1}{2}$ ↓ $2 \xrightarrow{\ ^2\ } 4$

$x^2 + 4x + 4 \quad -4 + 1$

$y = (x+2)^2 - 3 \quad \Rightarrow \text{Top}(-2, -3)$

$(x+2)^2 - 3 = 0$ snijp. x-as.

$(x+2+\sqrt{3})(x+2-\sqrt{3}) = 0$

$(x+2)^2 = 3$

$x+2 = \pm\sqrt{3}$

$x = -2 \pm \sqrt{3}$