

# Alpha Wiskunde Formuleblad

## Alpha Mathematics Formula Sheet

### ALGEBRA

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	$ x  = \begin{cases} x & \text{as / if } x \geq 0 \\ -x & \text{as / if } x < 0 \end{cases}$	Cramer se reël / Cramer's rule $x_i = \frac{ A_i }{ A }$
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$(a + b)^n = \sum_{r=0}^n \binom{n}{r} a^{n-r} b^r$	$(1 + x)^n = 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \dots$ ; mits / if $ x  < 1$
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### VEKTORE

$ AB  = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$	$\mathbf{u} \times \mathbf{v} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ u_1 & u_2 & u_3 \\ v_1 & v_2 & v_3 \end{vmatrix}$		
$ OP  = \sqrt{a^2 + b^2 + c^2}$	$\mathbf{u} \cdot \mathbf{v} =  \mathbf{u}  \mathbf{v}  \cos \theta$ $\mathbf{u} \cdot \mathbf{v} = x_1 \cdot x_2 + y_1 \cdot y_2 + z_1 \cdot z_2$	$ \mathbf{u} \times \mathbf{v}  =  \mathbf{u}  \mathbf{v}  \sin \theta$	$\alpha = \text{bgcos} \left( \frac{u_n}{ \mathbf{u} } \right)$ $\alpha = \text{arccos} \left( \frac{u_n}{ \mathbf{u} } \right)$

### CALCULUS

$a_{n+1} = a_n - \frac{f(a_n)}{f'(a_n)}$	$\int f'(g(x)) \cdot g'(x) dx = f(g(x)) + k$
$V = \pi \int_a^b [f(x)]^2 dx$	

## TRIGONOMETRIE / TRIGONOMETRY

<b>In 'n sektor / In a sector:</b> $s = r\theta$ en / and $A = \frac{1}{2}r^2\theta$		
<b>Identiteite / Identities:</b>		
$\sin^2 x + \cos^2 x = 1$	$\tan^2 x + 1 = \sec^2 x$	$\cot^2 x + 1 = \operatorname{cosec}^2 x$
$\operatorname{cosec} x = \frac{1}{\sin x}$	$\sec x = \frac{1}{\cos x}$	$\cot x = \frac{1}{\tan x}$

## TABEL MET AFGELEIDES / TABLE WITH DERIVATIVES

$F(x)$	$F'(x)$
$ax^n$	$nax^{n-1}$
$\sin x$	$\cos x$
$\cos x$	$-\sin x$
$\tan x$	$\sec^2 x$
$\cot x$	$-\operatorname{cosec}^2 x$
$\sec x$	$\sec x \cdot \tan x$
$\operatorname{cosec} x$	$-\operatorname{cosec} x \cdot \cot x$
bgsin $x$ arcsin $x$	$\frac{1}{\sqrt{1-x^2}}$
bgcoss $x$ arccos $x$	$\frac{-1}{\sqrt{1-x^2}}$
bgtan $x$ arctan $x$	$\frac{1}{x^2+1}$

## Reëls van differensiasie/ Rules for differentiation

$f(x) \cdot g(x)$	$f'(x) \cdot g(x) + f(x) \cdot g'(x)$
$\frac{f(x)}{g(x)}$	$\frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{[g(x)]^2}$
$f[g(x)]$	$f'[g(x)] \cdot g'(x)$