

## Breuken

Rekenregel	Voorbeeld
$\frac{ca}{cb} = \frac{a}{b}$	$\frac{2 \cdot 3}{2 \cdot 4} = \frac{3}{4}$
$\frac{a/c}{b/c} = \frac{a}{b}$	$\frac{3/2}{4/2} = \frac{3}{4}$
$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$	$\frac{1}{2} \cdot \frac{3}{4} = \frac{1 \cdot 3}{2 \cdot 4} = \frac{3}{8}$
$a \div \frac{b}{c} = a \cdot \frac{c}{b} = \frac{ac}{b}$	$2 \div \frac{3}{4} = 2 \cdot \frac{4}{3} = \frac{2 \cdot 4}{3} = \frac{8}{3}$
$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c}$	$\frac{1}{2} \div \frac{3}{4} = \frac{1}{2} \cdot \frac{4}{3} = \frac{4}{6}$
$\frac{a}{b} + \frac{c}{b} = \frac{a+c}{b}$	$\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$
$\frac{a}{b} + \frac{c}{d} = \frac{ad}{bd} + \frac{bc}{bd} = \frac{ad+bc}{bd}$	$\frac{1}{2} + \frac{3}{4} = \frac{1 \cdot 4}{2 \cdot 4} + \frac{2 \cdot 3}{2 \cdot 4} = \frac{4+6}{8} = \frac{12}{8}$

## Exponenten en logaritmen

$$\begin{array}{ccc} a^{\log(c)} = b & & a^b = c \\ \text{tot de macht} & & \text{is} \\ \text{is} & & \log \end{array}$$

Rekenregel	Voorbeeld
$a^n \cdot a^m = a^{n+m}$	$2^2 \cdot 2^3 = 2^{2+3} = 2^5$
$a^n \div a^m = a^{n-m}$ als $a \neq 0$	$2^5 \div 2^2 = 2^{5-2} = 2^3$
$(a^n)^m = a^{nm}$	$(2^2)^2 = 2^4$
$(a^n \cdot b^m)^q = a^{nq} \cdot b^{mq}$	$(2^3 \cdot 3^4)^2 = 2^{6 \cdot 2} \cdot 3^8$
$a^{-n} = 1/a^n$	$4^{-2} = 1/4^2$
$a^0 = 1$	$2^0 = 1$
Rekenregel	Voorbeeld
${}^b \log b^a = a$	${}^{10} \log 1000 = {}^{10} \log 10^3 = 3$
$\log a + \log b = \log ab$	$\log 100 + \log 10 = \log 1000$
$\log a - \log b = \log a/b$	$\log 8 - \log 2 = \log 8/2 = \log 4$
$a \cdot \log b = \log b^a$	$7 \cdot \log 5 = \log 5^7$
${}^a \log a = 1$	${}^2 \log 2 = 1$
${}^a \log c = b \Rightarrow a^b = c$	${}^2 \log 8 = 3 \Rightarrow 2^3 = 8$

## ABC-formule

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

## Afgeleide van functies

Functie	Afgeleide	f(x)	f'(x)
$a$	0	6	0
$ax$	$a$	$7x$	7
$ax^b$	$b \cdot ax^{b-1}$	$8x^3$	$24x^2$
$c \cdot f(x)$	$c \cdot f'(x)$	$2x^{13}$	$2 \cdot 13x^{12} = 26x^{12}$
$f(x) + g(x)$	$f'(x) + g'(x)$	$x^4 + 4x$	$4x^3 + 4$
$a^x$	$a^x \cdot \ln(a)$	$2^x$	$2^x \cdot \ln(2)$
$e^x$	$e^x$	$e^x$	$e^x$
$ae^{bx}$	$b \cdot ae^{bx}$	$\frac{1}{2} \cdot \pi\sqrt{2} \cdot e^{2x}$	$\pi\sqrt{2} \cdot e^{2x}$
$e^{f(x)}$	$f'(x) \cdot e^{f(x)}$	$e^{2x^2-x}$	$(4x-1) \cdot e^{2x^2-x}$
$a^{f(x)}$	$\ln(a) \cdot f'(x) \cdot a^{f(x)}$	$5^{4x-1}$	$\ln(5) \cdot 4 \cdot 5^{4x-1}$
$\ln(x)$	$\frac{1}{x}$	$\ln(x)$	$\frac{1}{x}$
$\ln(ax) = \ln(a) + \ln(x)$	$\frac{1}{x}$	$\ln(4x) = \ln(4) + \ln(x)$	$\frac{1}{x}$
$f(x) \cdot g(x)$	$f'(x) \cdot g(x) + f(x) \cdot g'(x)$	$(x^2 - 4)(x^3 + 2x + 3)$	$5x^4 - 6x^2 + 6x - 8$
$\frac{f(x)}{g(x)}$	$\frac{g(x) \cdot f'(x) - f(x) \cdot g'(x)}{(g(x))^2}$	$\frac{4x+1}{x^2+1}$	$\frac{-4x^2-2x+4}{(x^2+1)^2}$

## Grafieken van belangrijke functies

