Differentiëren goniometrische functies (H8: opgave 78, 79, 80)

Opgave	Functie	Afgeleide
1	$f(x) = 3 + 4\sin(2x - \frac{1}{3}\pi)$	
2	$f(x) = 10 + 16\cos\left(\frac{1}{2}(x-1)\right)$	
3	$g(x) = x\cos(x)$	
4	$h(x) = \frac{x^2 + \sin(x)}{\cos(x)}$	
5	$g(x) = 2x\sin(3x - 1)$	
6	$j(x) = \frac{\cos(x)}{\sin(x)}$	
7	$k(x) = \cos^2(x)$	
8	$g(x) = x^2\sin(3x)$	
9	$l(x) = x + 3\sin^2(x)$	
10	$h(x) = \frac{\sin(x)}{x + \sin(x)}$	

Uitwerkingen

Opgave	Functie	Afgeleide
1	$f(x) = 3 + 4\sin(2x - \frac{1}{3}\pi)$	$f'(x) = 8\cos(2x - \frac{1}{3}\pi)$
2	$f(x) = 10 + 16\cos\left(\frac{1}{2}(x-1)\right)$	$f'(x) = -8\sin\left(\frac{1}{2}(x-1)\right)$
3	$g(x) = x\cos(x)$	$g'(x) = 1\cdot\cos(x) + x\cdot -\sin(x)$ $= \cos(x) - x\sin(x)$
4	$h(x) = \frac{x^2 + \sin(x)}{\cos(x)}$	$h'(x) = \frac{\cos(x)(2x+\cos(x)) - (x^2+\sin(x))\cdot -\sin(x)}{\cos^2(x)}$ $= \frac{2x\cos(x) + \cos^2(x) + x^2\sin(x) + \sin^2(x)}{\cos^2(x)}$ $= \frac{2x\cos(x) + x^2\sin(x)}{\cos^2(x)}$
5	$g(x) = 2x\sin(3x-1)$	$g'(x) = 2\cdot\sin(3x-1) + 2x\cdot\cos(3x-1)\cdot 3$ $= 2\sin(3x-1) + 6x\cos(3x-1)$
6	$j(x) = \frac{\cos(x)}{\sin(x)}$	$j'(x) = \frac{\sin(x)\cdot -\sin(x) - \cos(x)\cdot\cos(x)}{\sin^2(x)}$ $= \frac{-\sin^2(x) - \cos^2(x)}{\sin^2(x)} = -\frac{1}{\sin^2(x)}$
7	$k(x) = \cos^2(x)$	$k(x) = (\cos(x))^2$ $k'(x) = -2\sin(x)\cos(x)$
8	$g(x) = x^2\sin(3x)$	$g'(x) = 2x\cdot\sin(3x) + x^2\cdot\cos(3x)\cdot 3$ $= 2x\sin(3x) + 3x^2\cos(3x)$
9	$l(x) = x + 3\sin^2(x)$	$l'(x) = 1 + 6\sin(x)\cos(x)$
10	$h(x) = \frac{\sin(x)}{x + \sin(x)}$	$h'(x) = \frac{(x+\sin(x))\cdot\cos(x) - \sin(x)(1+\cos(x))}{(x+\sin(x))^2}$ $= \frac{x\cos(x) - \sin(x)}{(x+\sin(x))^2}$