Wiskundeplan

Rekenvaardigheden: Afgeleiden

(Versie 2025/02/26.54)

Inhoudsopgave

1.0.A Oefeningen niveau 1

Oefening 1.0.1. Bereken de afgeleide van volgende veeltermen

1. $\frac{\mathrm{d}}{\mathrm{d}x}(1) = 0$
2. $\frac{\mathrm{d}}{\mathrm{d}x}(x) = 1$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2\right) = 2x$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^3\right) = 3x^2$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^4\right) = 4x^3$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^5\right) = 5x^4$

Oefening 1.0.2. Bereken de afgeleide van volgende veeltermen

1. $\frac{\mathrm{d}}{\mathrm{d}x}(x+1) = 1$
2. $\frac{\mathrm{d}}{\mathrm{d}x}(x+2) = 1$
3. $\frac{\mathrm{d}}{\mathrm{d}x}(x+3) = 1$
4. $\frac{\mathrm{d}}{\mathrm{d}x}(2x+1) = 2$
5. $\frac{\mathrm{d}}{\mathrm{d}x}(2x+2) = 2$
6. $\frac{\mathrm{d}}{\mathrm{d}x}(2x+3) = 2$
7. $\frac{\mathrm{d}}{\mathrm{d}x}(3x+1) = 3$

Oefening 1.0.3. Bereken de afgeleide van volgende veeltermen

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2+1\right) = 2x$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2+2\right) = 2x$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2+x\right) = 2x+1$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2+2x\right) = 2x+2$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2+x+1\right) = 2x+1$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2+x+2\right) = 2x+1$

Oefening 1.0.4. Bereken de afgeleide van volgende veeltermen

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(2x^2\right) = 4x$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(2x^2+1\right) = 4x$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(2x^2+x\right) = 4x+1$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(2x^2+x+1\right) = 4x+1$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(2x^2+2x+1\right) = 4x+2$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(2x^2+\pi x+1\right) = 4x+\pi$

1.0.B Oefeningen niveau 2

Oefening 1.0.5. Bereken de afgeleide van volgende veeltermen

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(4x^3+2x^2+7x+5\right) = 12x^2+4x+7$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-3x^3+5x^2-2x+8\right) = -9x^2+10x-2$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(7x^3-4x^2+x-6\right) = 21x^2-8x+1$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^3+3x^2+5x+7\right) = 3x^2+6x+5$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-2x^3+6x^2-4x+10\right) = -6x^2+12x-4$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(5x^3-x^2+2x+9\right) = 15x^2-2x+2$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-x^3+4x^2-7x+3\right) = -3x^2+8x-7$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(2x^3+x^2-5x+4\right) = 6x^2+2x-5$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-4x^3+3x^2-x+6\right) = -12x^2+6x-1$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(3x^3-2x^2+8x-5\right) = 9x^2-4x+8$

Oefening 1.0.6. Bereken de afgeleide van volgende veeltermen

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(4x^4+3x^3+2x^2+x+5\right) = 16x^3+9x^2+4x+1$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-2x^4+5x^3-7x^2+4x-6\right) = -8x^3+15x^2-14x+4$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^4-2x^3+3x^2-4x+5\right) = 4x^3-6x^2+6x-4$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(6x^4-3x^3+x^2-2x+7\right) = 24x^3-9x^2+2x-2$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-x^4+4x^3-5x^2+2x-8\right) = -4x^3+12x^2-10x+2$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(3x^4-x^3+6x^2-2x+9\right) = 12x^3-3x^2+12x-2$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-5x^4+2x^3-x^2+3x-4\right) = -20x^3+6x^2-2x+3$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(2x^4-3x^3+5x^2-x+6\right) = 8x^3-9x^2+10x-1$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-4x^4+x^3-2x^2+7x-3\right) = -16x^3+3x^2-4x+7$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^4+2x^3-4x^2+6x-5\right) = 4x^3+6x^2-8x+6$

1.0.B Oefeningen niveau 2

Oefening 1.0.7. Bereken de afgeleide van volgende veeltermen

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(4x^5+3x^4+2x^3+x^2+5x+7\right) = 20x^4+12x^3+6x^2+2x+5$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-2x^5+5x^4-7x^3+4x^2-6x+3\right) = -10x^4+20x^3-21x^2+8x-6$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^5-2x^4+3x^3-4x^2+5x-6\right) = 5x^4-8x^3+9x^2-8x+5$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(6x^5-3x^4+x^3-2x^2+7x-8\right) = 30x^4-12x^3+3x^2-4x+7$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-x^5+4x^4-5x^3+2x^2-8x+9\right) = -5x^4+16x^3-15x^2+4x-8$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(3x^5-x^4+6x^3-2x^2+9x-4\right) = 15x^4-4x^3+18x^2-4x+9$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-5x^5+2x^4-x^3+3x^2-4x+6\right) = -25x^4+8x^3-3x^2+6x-4$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(2x^5-3x^4+5x^3-x^2+6x-7\right) = 10x^4-12x^3+15x^2-2x+6$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-4x^5+x^4-2x^3+7x^2-3x+8\right) = -20x^4+4x^3-6x^2+14x-3$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^5+2x^4-4x^3+6x^2-5x+9\right) = 5x^4+8x^3-12x^2+12x-5$

1.0.C Oefeningen niveau 3

Oefening 1.0.8.

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(4x^2+6\right) = 8x$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(5x^3+7x-6\right) = 15x^2+7$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(5x^4-7x\right) = 20x^3-7$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-2x^3+x^2+4\right) = -6x^2+2x$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(5x^4-x+8\right) = 20x^3-1$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-x^5+3x^4+2x^2-6x+9\right) = -5x^4+12x^3+4x-6$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(6x^3+5x-7\right) = 18x^2+5$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^4+2x^3-5\right) = 4x^3+6x^2$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(7x^2-3x+2\right) = 14x-3$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-4x^5+x^4-2x^3+6x^2-x+8\right) = -20x^4+4x^3-6x^2+12x-1$

Oefening 1.0.9.

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(3x^3+5x-7\right) = 9x^2+5$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-4x^4+x^3+2x-6\right) = -16x^3+3x^2+2$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(5x^5-7x^2+x-8\right) = 25x^4-14x+1$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^6-2x^5+3x^4-4x^3+7\right) = 6x^5-10x^4+12x^3-12x^2$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-2x^3+4x^2-x+9\right) = -6x^2+8x-1$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(6x^4+5x^2-2x+8\right) = 24x^3+10x-2$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-3x^5-7x^3+x^2+6\right) = -15x^4-21x^2+2x$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(4x^6-x^5+2x^4-3x^3+7x^2-x+9\right) = 24x^5-5x^4+8x^3-9x^2+14x-1$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-x^4+2x-4\right) = -4x^3+2$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(2x^6+x^4-7x^3+5x^2-x+4\right) = 12x^5+4x^3-21x^2+10x-1$

1.0.C Oefeningen niveau 3

Oefening 1.0.10.

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(5x^3-2x^2+4x-7\right)=15x^2-4x+4$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-3x^4+2x-6\right)=-12x^3+2$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(7x^5+2x^3-8x^2+x-9\right)=35x^4+6x^2-16x+1$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^6+2x^2-x+8\right)=6x^5+4x-1$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-2x^3+6x^2-x+5\right)=-6x^2+12x-1$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(4x^4-x^3+3x^2-2x+7\right)=16x^3-3x^2+6x-2$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-5x^5-8x^3-6x+4\right)=-25x^4-24x^2-6$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(3x^6-4x^5+2x^2-x+9\right)=18x^5-20x^4+4x-1$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^3+2x^2-4x+6\right)=3x^2+4x-4$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-2x^4+3x^3-5x^2+7x-8\right)=-8x^3+9x^2-10x+7$

Oefening 1.0.11.

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(6x^5+8x-7\right)=30x^4+8$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-x^6+7x^3-4x^2+x-9\right)=-6x^5+21x^2-8x+1$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(5x^3-x^2+7x\right)=15x^2-2x+7$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-4x^4+2x^3-3x^2+6x\right)=-16x^3+6x^2-6x+6$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(7x^5-3x^4-8x^2+2x\right)=35x^4-12x^3-16x+2$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^6-4x^5+2x^4-6x^3+5x^2-x\right)=6x^5-20x^4+8x^3-18x^2+10x-1$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-3x^3-2x\right)=-9x^2-2$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(4x^4-x^3+2x^2-5x\right)=16x^3-3x^2+4x-5$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(-2x^5-6x\right)=-10x^4-6$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(3x^6+4x^4-7x^3+2x^2-x\right)=18x^5+16x^3-21x^2+4x-1$

2.0.D Oefeningen niveau 1

Oefening 2.0.12. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}(\sin x) = \cos x$
2. $\frac{\mathrm{d}}{\mathrm{d}x}(\cos x) = -\sin x$
3. $\frac{\mathrm{d}}{\mathrm{d}x}(-\sin x) = -\cos x$
4. $\frac{\mathrm{d}}{\mathrm{d}x}(-\cos x) = \sin x$
5. $\frac{\mathrm{d}}{\mathrm{d}x}(2\sin x) = 2\cos x$
6. $\frac{\mathrm{d}}{\mathrm{d}x}(6\cos x) = -6\sin x$
7. $\frac{\mathrm{d}}{\mathrm{d}x}(-\pi\sin x) = -\pi\cos x$
8. $\frac{\mathrm{d}}{\mathrm{d}x}(-4\cos x) = 4\sin x$

Oefening 2.0.13. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}(\sin x + \cos x) = \cos x - \sin x$
2. $\frac{\mathrm{d}}{\mathrm{d}x}(\sin x \cdot \cos x) = \cos^2 x - \sin^2 x$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{\sin x}{\cos x}\right) = \sec^2 x$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{\cos x}{\sin x}\right) = -\csc^2 x$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin^2(x)\right) = 2\sin x\cos x$
6. $\frac{\mathrm{d}}{\mathrm{d}x}(\sin(2x)) = 2\cos(2x)$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{\sin x}\right) = -\csc x\cot x$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{\cos x}\right) = \sec x\tan x$

Oefening 2.0.14. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(3\sin^2 x\right) = 6\sin x\cos x$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(3\cos^2 x\right) = -6\cos x\sin x$
3. $\frac{\mathrm{d}}{\mathrm{d}x}(\cos(\sin x)) = -\sin(\sin x)\cos x$
4. $\frac{\mathrm{d}}{\mathrm{d}x}(\sin(\cos x)) = -\cos(\cos x)\sin x$
5. $\frac{\mathrm{d}}{\mathrm{d}x}(\cos(\cos x)) = \sin(\cos x)\sin x$
6. $\frac{\mathrm{d}}{\mathrm{d}x}(\tan(3x+1)) = 3\sec^2(3x+1)$
7. $\frac{\mathrm{d}}{\mathrm{d}x}(\sin(2x)\cdot\sin x) = \cos(2x)\cdot\sin x + \sin(2x)\cdot\cos x$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos(x^2)\cdot\tan(x^2)\right) = -2x\sin(x^2)\tan(x^2) + 2x\cos(x^2)\sec^2(x^2)$

2.0.E Oefeningen niveau 2

Oefening 2.0.15. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\tan^2 x\right) = 2\tan x \cdot \frac{1}{\cos^2 x}$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin^3 x\right) = 3\sin^2 x \cos x$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos^3 x\right) = -3\cos^2 x \sin x$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{\tan x}\right) = -\frac{1}{\sin^2 x}$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{\sin^2 x}\right) = -2\cos x \sin^{-3} x$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{\cos^2 x}\right) = 2\sin x \cos^{-3} x$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\tan(2x)\right) = 2\sec^2(2x)$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\tan(x^2)\right) = \frac{2x}{\cos^2(x^2)}$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin(3x)\cdot\cos(3x)\right) = 3\cos(6x)$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos(2x)\cdot\tan(2x)\right) = 2\sin(2x) + 2\cos^2(2x)/\cos^2(2x)$

Oefening 2.0.16. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin(x^2)\cdot\cos(x)\right) = 2x\cos(x^2)\cos(x) - \sin(x^2)\sin(x)$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin(x^4+2)\right) = 4x^3\cos(x^4+2)$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\pi + \cos x\right) = -\sin x$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos x + \pi - sinx\right) = -\cos x - \sin x$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{\tan(3x^2)}{\sin(3x^2)}\right) = \frac{6x\sin(3x^2)}{\cos^2(3x^2)}$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos^3(2x)\right) = -6\cos^2(2x)\sin(2x)$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left((sinx + cosx)^3\right) = 3(\sin x + \cos x)^2(\cos x - \sin x)$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(sin\pi\right) = 0$

2.0.E Oefeningen niveau 2

Oefening 2.0.17. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}(\sin(4x+1)) = 4\cos(4x+1)$
2. $\frac{\mathrm{d}}{\mathrm{d}x}(\cos(5x-3)) = -5\sin(5x-3)$
3. $\frac{\mathrm{d}}{\mathrm{d}x}(\sin(\cos x)) = -\cos(\cos x)\sin x$
4. $\frac{\mathrm{d}}{\mathrm{d}x}(\cos(\sin x)) = -\sin(\sin x)\cos x$
5. $\frac{\mathrm{d}}{\mathrm{d}x}(\tan(\tan x)) = \frac{1}{\cos^2 x}\cdot\frac{1}{\cos^2(\tan x)}$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin^2(\cos x)\right) = -2\cos(\cos x)\sin(\cos x)\sin x$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos^2(\sin x)\right) = -2\sin(\sin x)\cos(\sin x)\cos x$
8. $\frac{\mathrm{d}}{\mathrm{d}x}(x\sin x) = \sin x + x\cos x$
9. $\frac{\mathrm{d}}{\mathrm{d}x}(x\cos x) = \cos x - x\sin x$
10. $\frac{\mathrm{d}}{\mathrm{d}x}(x\tan x) = \tan x + x\sec^2 x$

Oefening 2.0.18. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin x + x^2\right) = \cos x + 2x$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos x + x^3\right) = -\sin x + 3x^2$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin^2 x + x^4\right) = 2\sin x\cos x + 4x^3$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos^2 x + x^5\right) = -2\sin x\cos x + 5x^4$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x\sin^2 x\right) = \sin 2x + 2x\sin x\cos x$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x\cos^2 x\right) = -\sin 2x + 2x\cos x\sin x$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin(2x) + x^2\right) = 2\cos(2x) + 2x$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos(3x) + x^3\right) = -3\sin(3x) + 3x^2$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\tan(x^2+1)\right) = \frac{2x}{\cos^2(x^2+1)}$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin^2(3x)\right) = 6\sin(3x)\cos(3x)$

2.0.E Oefeningen niveau 2

Oefening 2.0.19. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos^2(4x)\right) = -8\sin(4x)\cos(4x)$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin(x)\cdot\cos(x^2)\right) = \cos x\cos(x^2) - 2x\sin x\sin(x^2)$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin(x^2)\cdot\cos x\right) = 2x\cos(x^2)\cos x - \sin(x^2)\sin x$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin(\cos(x^2))\right) = -2x\sin x\cos(\cos(x^2))$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos(\sin(x^3))\right) = -3x^2\cos x\sin(\sin(x^3))$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2\sin x\right) = 2x\sin x + x^2\cos x$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^3\cos x\right) = 3x^2\cos x - x^3\sin x$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^4\sin(2x)\right) = 4x^3\sin(2x) + 2x^4\cos(2x)$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^5\cos(3x)\right) = 5x^4\cos(3x) - 3x^5\sin(3x)$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x^2}{\sin x}\right) = \frac{2x\sin x - x^2\cos x}{\sin^2 x}$

Oefening 2.0.20. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{\tan x}{x}\right) = \frac{x\sec^2 x - \tan x}{x^2}$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x^3}{\cos x}\right) = \frac{3x^2\cos x + x^3\sin x}{\cos^2 x}$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x}{\sin x}\right) = \frac{\sin x - x\cos x}{\sin^2 x}$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x^2}{\cos x}\right) = \frac{2x\cos x + x^2\sin x}{\cos^2 x}$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x^3}{\sin x}\right) = \frac{3x^2\sin x - x^3\cos x}{\sin^2 x}$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x}{\cos x}\right) = \frac{\cos x + x\sin x}{\cos^2 x}$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x^4}{\sin(2x)}\right) = \frac{4x^3\sin(2x) - 2x^4\cos(2x)}{\sin^2(2x)}$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x^5}{\cos(2x)}\right) = \frac{5x^4\cos(2x) + 2x^5\sin(2x)}{\cos^2(2x)}$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\tan(x^3+x)\right) = \frac{(3x^2+1)}{\cos^2(x^3+x)}$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2\sin(x^2+1)\right) = 2x\sin(x^2+1) + 2x^3\cos(x^2+1)$

2.0.F Oefeningen niveau 3

2.0.F Oefeningen niveau 3

Oefening 2.0.21. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x^6}{\sin(3x)}\right) = \frac{6x^5\sin(3x) - 3x^6\cos(3x)}{\sin^2(3x)}$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^3\cos(x^4+x)\right) = 3x^2\cos(x^4+x) - x^3(4x^3+1)\sin(x^4+x)$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\tan(x^5+x^3)\right) = \frac{(5x^4+3x^2)}{\cos^2(x^5+x^3)}$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x^4}{\cos(x^3+x)}\right) = \frac{4x^3\cos(x^3+x) + (3x^2+1)x^4\sin(x^3+x)}{\cos^2(x^3+x)}$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2\sin(x^4+x^2)\right) = 2x\sin(x^4+x^2) + x^2(4x^3+2x)\cos(x^4+x^2)$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\cos(x^2+\sin x)\right) = -(2x+\cos x)\sin(x^2+\sin x)$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\sin^3(x^2+2x)\right) = 3\sin^2(x^2+2x)\cos(x^2+2x)(2x+2)$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^3\cos^2(x^2)\right) = 3x^2\cos^2(x^2) - 2x^3\cos(x^2)\sin(x^2)\cdot 2x$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x^5}{\sin^2(2x)}\right) = \frac{5x^4\sin^2(2x) - 4x^5\sin(2x)\cos(2x)}{\sin^4(2x)}$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\tan^2(x^3+x)\right) = 2\tan(x^3+x)\cdot\frac{(3x^2+1)}{\cos^2(x^3+x)}$

3.0.G Oefeningen niveau 1

Oefening 3.0.22. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}(e^x) = e^x$
2. $\frac{\mathrm{d}}{\mathrm{d}x}(2e^x) = 2e^x$
3. $\frac{\mathrm{d}}{\mathrm{d}x}(3e^x) = 3e^x$
4. $\frac{\mathrm{d}}{\mathrm{d}x}(e^x + 1) = e^x$
5. $\frac{\mathrm{d}}{\mathrm{d}x}(e^x + 2) = e^x$
6. $\frac{\mathrm{d}}{\mathrm{d}x}(e^x + e^x) = 2e^x$
7. $\frac{\mathrm{d}}{\mathrm{d}x}(3e^x - 10e^x) = -7e^x$
8. $\frac{\mathrm{d}}{\mathrm{d}x}(e^\pi) = 0$
9. $\frac{\mathrm{d}}{\mathrm{d}x}(\pi e^x) = \pi e^x$

Oefening 3.0.23. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^2 x\right) = 2e^{2x}$
2. $\frac{\mathrm{d}}{\mathrm{d}x}(e^{-x}) = -e^{-x}$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{x^2}\right) = 2xe^{x^2}$
4. $\frac{\mathrm{d}}{\mathrm{d}x}(xe^x) = (1+x)e^x$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2e^x\right) = xe^x(2+x)$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{2x+1}\right) = 2e^{2x+1}$
7. $\frac{\mathrm{d}}{\mathrm{d}x}(e^\pi e^x) = e^\pi e^x$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{\sin x}\right) = \cos(x)e^x$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{\cos x}\right) = -\sin(x)e^x$

Oefening 3.0.24.

1. $\frac{\mathrm{d}}{\mathrm{d}x}(\ln x) = \frac{1}{x}$
2. $\frac{\mathrm{d}}{\mathrm{d}x}(\ln(2x)) = \frac{1}{x}$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\ln(x^2)\right) = \frac{2}{x}$
4. $\frac{\mathrm{d}}{\mathrm{d}x}(\ln(3x+1)) = \frac{3}{3x+1}$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\ln(x^3+4)\right) = \frac{3x^2}{x^3+4}$
6. $\frac{\mathrm{d}}{\mathrm{d}x}(x\ln x) = \ln x + 1$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2\ln x\right) = 2x\ln x + x$
8. $\frac{\mathrm{d}}{\mathrm{d}x}(\ln(\sin x)) = \frac{\cos x}{\sin x}$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(\ln(x^2+1)\right) = \frac{2x}{x^2+1}$
10. $\frac{\mathrm{d}}{\mathrm{d}x}(\ln(e^x)) = 1$

3.0.H Oefeningen niveau 2

Oefening 3.0.25. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{3x}\right) = 3e^{3x}$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{-2x}\right) = -2e^{-2x}$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{x^3}\right) = 3x^2e^{x^3}$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(xe^{x^2}\right) = e^{x^2}(1+2x^2)$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^3e^{x}\right) = e^{x}x^2(3+x)$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{3x+5}\right) = 3e^{3x+5}$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{x}+e^{-x}\right) = e^{x}-e^{-x}$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{\sin(2x)}\right) = 2\cos(2x)e^{\sin(2x)}$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{\cos(3x)}\right) = -3\sin(3x)e^{\cos(3x)}$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{x^4+x}\right) = (4x^3+1)e^{x^4+x}$

Oefening 3.0.26. Bereken de afgeleide

1. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{x}\cdot e^{x}\right) = 2e^{x}e^{x}$
2. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{x+e^{x}}\right) = (1+e^{x})e^{x+e^{x}}$
3. $\frac{\mathrm{d}}{\mathrm{d}x}\left(xe^{x^3}\right) = e^{x^3}(1+3x^3)$
4. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{x^2+4x}\right) = (2x+4)e^{x^2+4x}$
5. $\frac{\mathrm{d}}{\mathrm{d}x}\left(xe^{2x}\right) = e^{2x}(1+2x)$
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{\tan x}\right) = \sec^2 x\cdot e^{\tan x}$
7. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{\ln x}\right) = \frac{1}{x}e^{\ln x}$
8. $\frac{\mathrm{d}}{\mathrm{d}x}\left(e^{x^3+x^2}\right) = (3x^2+2x)e^{x^3+x^2}$
9. $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2e^{x^2}\right) = e^{x^2}x(2+x^2)$
10. $\frac{\mathrm{d}}{\mathrm{d}x}\left(xe^{x+1}\right) = e^{x+1}(1+x)$

Oefening 3.0.27. Bereken de afgeleide

1. $e^{\cos^2 x} = -2\sin x\cos x e^{\cos^2 x}$
2. $e^{\sin^2 x} = 2\sin x\cos x e^{\sin^2 x}$
3. $e^{x+e^{x}} = (1+e^{x})e^{x+e^{x}}$
4. $x^3e^{x^2} = e^{x^2}x^2(3+2x^2)$
5. $e^{\tan^2 x} = 2\tan x\sec^2 x e^{\tan^2 x}$
6. $xe^{x^4} = e^{x^4}(1+4x^4)$
7. $e^{\ln(x^2)} = \frac{2}{x}e^{\ln(x^2)}$
8. $e^{\cos(x^2)} = -2x\sin(x^2)e^{\cos(x^2)}$
9. $e^{x+e^{x^2}} = (1+2xe^{x^2})e^{x+e^{x^2}}$
10. $e^{\sin(x^3)} = 3x^2\cos(x^3)e^{\sin(x^3)}$