

Derivaamissääntöjä:

1. $Dk = 0$, k vakio

2. $DX^m = mX^{m-1}$

3. $D(k \cdot f(x)) = k \cdot Df(x) = k f'(x)$, k vakio

4. $D(f(x) + g(x)) = Df(x) + Dg(x) = f'(x) + g'(x)$

Esim. a) $DX^6 \stackrel{2.}{=} 6X^5$

b) $D(3X^4) \stackrel{3.}{=} 3DX^4 \stackrel{2.}{=} 3 \cdot 4X^3 = 12X^3$

c) $D(2X^3 - 4X + 1) \stackrel{4.}{=} D(2X^3) + D(-4X) + D1$
 $\stackrel{3.}{=} 2 \cdot DX^3 - 4DX + 0$
 $\stackrel{2.}{=} 2 \cdot 3X^2 - 4 \cdot 1 \underbrace{X^0}_{=1}$
 $= 6X^2 - 4$

Esim. $f(x) = x^3 + 3x^2 - 9x + 4$.
Tarkka $f'(-2)$ ja määritä derivaatan 0-pisteet.

Ratk. $f'(x) = 3x^2 + 6x - 9$

$f'(-2) = 3 \cdot (-2)^2 + 6 \cdot (-2) - 9 = 12 - 12 - 9 = -9$

derivaatan 0-pisteet: $f'(x) = 3x^2 + 6x - 9 = 0 \Leftrightarrow x = \underline{\underline{\begin{Bmatrix} -3 \\ 1 \end{Bmatrix}}}$

6.3 a) $f(x) = -2x^3 + x^2 - x + 1$

$f'(x) = -6x^2 + 2x - 1$

$f'(2) = -6 \cdot 2^2 + 2 \cdot 2 - 1 = -21$

b) $f(t) = 125t^2 - 110t$

$f'(t) = 250t - 110$

$f'(2) = 250 \cdot 2 - 110 = 390$