Løsningsforslag — Minitest: Derivering

- Våren 2015

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

$f'(x) = 3x^2 + 4x - 3$

b) $g(x) = \ln(x-2)$

$g(x) = f(u(x))$ hvor

$f(u) = \ln(u)$ og $u(x) = (x-2)$

$f'(u) = \frac{1}{u}$, siden $(\ln x)' = \frac{1}{x}$ og

$u'(x) = 1$, siden $(x-2)' = 1$.

Kjerneregelen

$\boxed{g'(x) = f'(u) \cdot u'(x)} = \frac{1}{u} \cdot 1 = \underline{\underline{\frac{1}{x-2}}}$

Forventet: $g(x) = \ln(x-2)$

$g'(x) = \frac{1}{x-2} \cdot (x-2)'$

$= \underline{\underline{\frac{1}{x-2}}}$

c) $h(x) = (2x^2 - 1)^3$

$h'(x) = 3(2x^2-1)^2 \cdot (2x^2-1)'$

$= 3 \cdot (2x^2-1)^2 \cdot 4x$

$= \underline{\underline{12x(2x^2-1)^2}}$

• Høsten 2017

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

$\underline{\underline{f'(x) = 6x - 2}}$

b) $g(x) = x^2 \cdot e^x$

$g(x) = u(x) \cdot v(x)$ hvor $u(x) = x^2$ og $v(x) = e^x$

$\boxed{g'(x) = u'(x) \cdot v(x) + u(x) \cdot v'(x)}$ — produktregelen

$u'(x) = 2x$ $\quad v'(x) = e^x$

$g'(x) = 2x \cdot e^x + x^2 \cdot e^x$ — kan settes som endelig svar

$\underline{\underline{g'(x) = xe^x(2 + x)}}$

c) $h(x) = \ln(x^3 - 1)$

$\boxed{h'(x) = \frac{1}{x^3 - 1} \cdot (x^3 - 1)'}$ — Kjerneregelen

$\underline{\underline{h'(x) = \frac{3x^2}{x^3 - 1}}}$

• Høsten 2013

a) $f(x) = 2 \cdot e^{3x}$

$f'(x) = 2 \cdot 3\ e^{3x}$

$(3x)'$ Kjerneregelen — eller at $(e^{kx})' = ke^{kx}$

$$\underline{\underline{f'(x) = 6e^{3x}}}$$

b) $g(x) = 2x \cdot \ln(3x)$

$g'(x) = \underbrace{2}_{(2x)'} \cdot \ln(3x) + 2x \cdot \underbrace{\frac{3}{3x}}_{(\ln 3x)'}$

$g'(x) = 2\ln(3x) + 2$ — kan settes som endelig svar

$$\underline{\underline{g'(x) = 2\left(\ln(3x) + 1\right)}}$$

c) $h(x) = \dfrac{2x-1}{x+1}$

$h(x) = \dfrac{u(x)}{v(x)}$ hvor $u(x) = 2x-1$, $u'(x) = 2$ og $v(x) = x+1$
$v'(x) = 1$

$$\boxed{h'(x) = \frac{u'(x) \cdot v(x) - u(x) \cdot v'(x)}{(v(x))^2}}$$ — Kvotientregelen

$$h'(x) = \frac{2(x+1) - 1 \cdot (2x-1)}{(x+1)^2}$$

$$\underline{\underline{h'(x) = \frac{4}{(x+1)^2}}}$$

- Høsten 2016

a) $f(x) = 2x^2 - 5x - 6$

$$\underline{\underline{f'(x) = 4x - 5}}$$

b) $g(x) = x \ln x$

$g'(x) = 1 \cdot \ln x + x \cdot \frac{1}{x}$ — Produktregelen

$$\underline{\underline{g'(x) = \ln x + 1}}$$

c) $h(x) = \dfrac{e^{2x}}{x-3}$

$$h'(x) = \frac{2e^{2x}(x-3) - e^{2x} \cdot 1}{(x-3)^2}$$

$2xe^{2x} - 6e^{2x} - e^{2x} = e^{2x}(2x-7)$

$$\underline{\underline{h'(x) = \frac{e^{2x}(2x-7)}{(x-3)^2}}}$$