Lösung 2 - Aufgabe 2a

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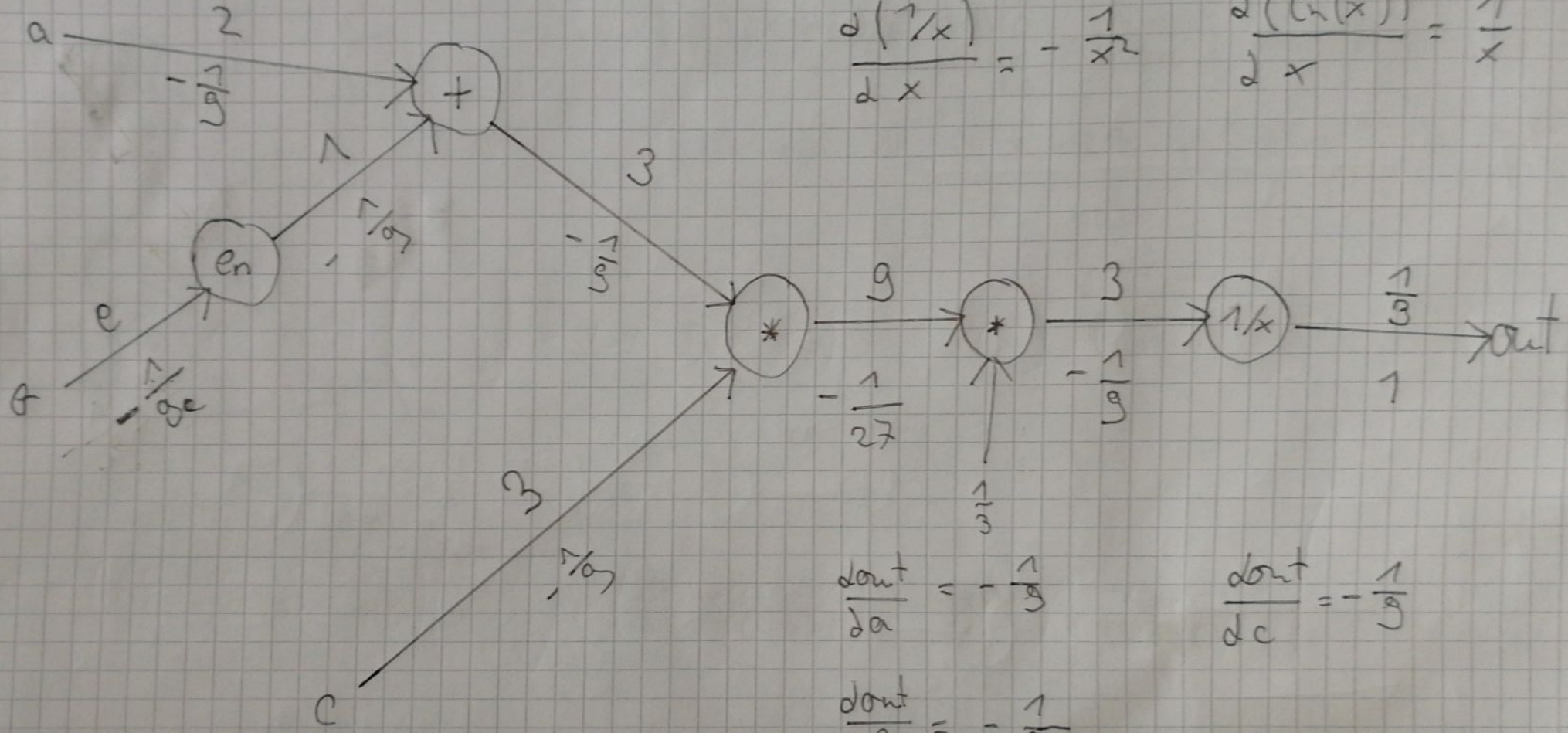

$$\frac{d(1/x)}{dx} = -\frac{1}{x^2} \qquad \frac{d(\ln(x))}{dx} = \frac{1}{x}$$

$$\frac{dout}{da} = -\frac{1}{9} \qquad \frac{dout}{dc} = -\frac{1}{9}$$

$$\frac{dout}{de} = -\frac{1}{9e}$$

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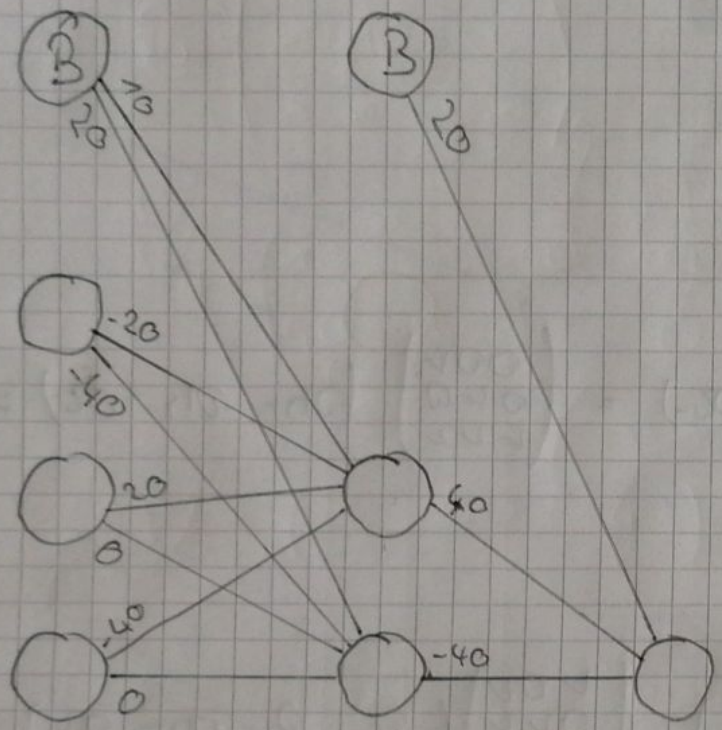

x_1

$\begin{pmatrix} 10 & -20 & 20 & -40 \\ 20 & -40 & 0 & 0 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} -10 \\ 20 \end{pmatrix}$ $g\left(\begin{pmatrix} -10 \\ 20 \end{pmatrix}\right) = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

$(20 \quad 40 \quad -40) \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix} = -20$ $g(-20) = 0$ ≠

x_2

$\begin{pmatrix} 10 & -20 & 20 & -40 \\ 20 & -40 & 0 & 0 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} 10 \\ -20 \end{pmatrix}$ $g\left(\begin{pmatrix} 10 \\ -20 \end{pmatrix}\right) = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

$(20 \quad 40 \quad -40) \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} = 60$ $g(60) = 1$ ≠

x_3

$\begin{pmatrix} 10 & -20 & 20 & -40 \\ 20 & -40 & 0 & 0 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} -50 \\ -20 \end{pmatrix}$ $g\left(\begin{pmatrix} -50 \\ -20 \end{pmatrix}\right) = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$

$(20 \quad 40 \quad -40) \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} = 20$ $g(20) = 1$ ≠

Siehe Rückseite für elegantere Lösung

$$\sigma_1 = \begin{pmatrix} 10 & -20 & 20 & -40 \\ 20 & -40 & 0 & 0 \end{pmatrix} \begin{pmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{pmatrix} = \begin{pmatrix} -10 & 10 & -50 \\ 20 & -20 & -20 \end{pmatrix} \qquad g(\sigma_1) = \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}$$

$$\sigma_6 = (20 \quad 40 \quad -40) \begin{pmatrix} 1 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix} = (-20 \quad 60 \quad 20) \qquad g(\sigma_6) = \underline{\underline{(0\,1\,1)}}$$

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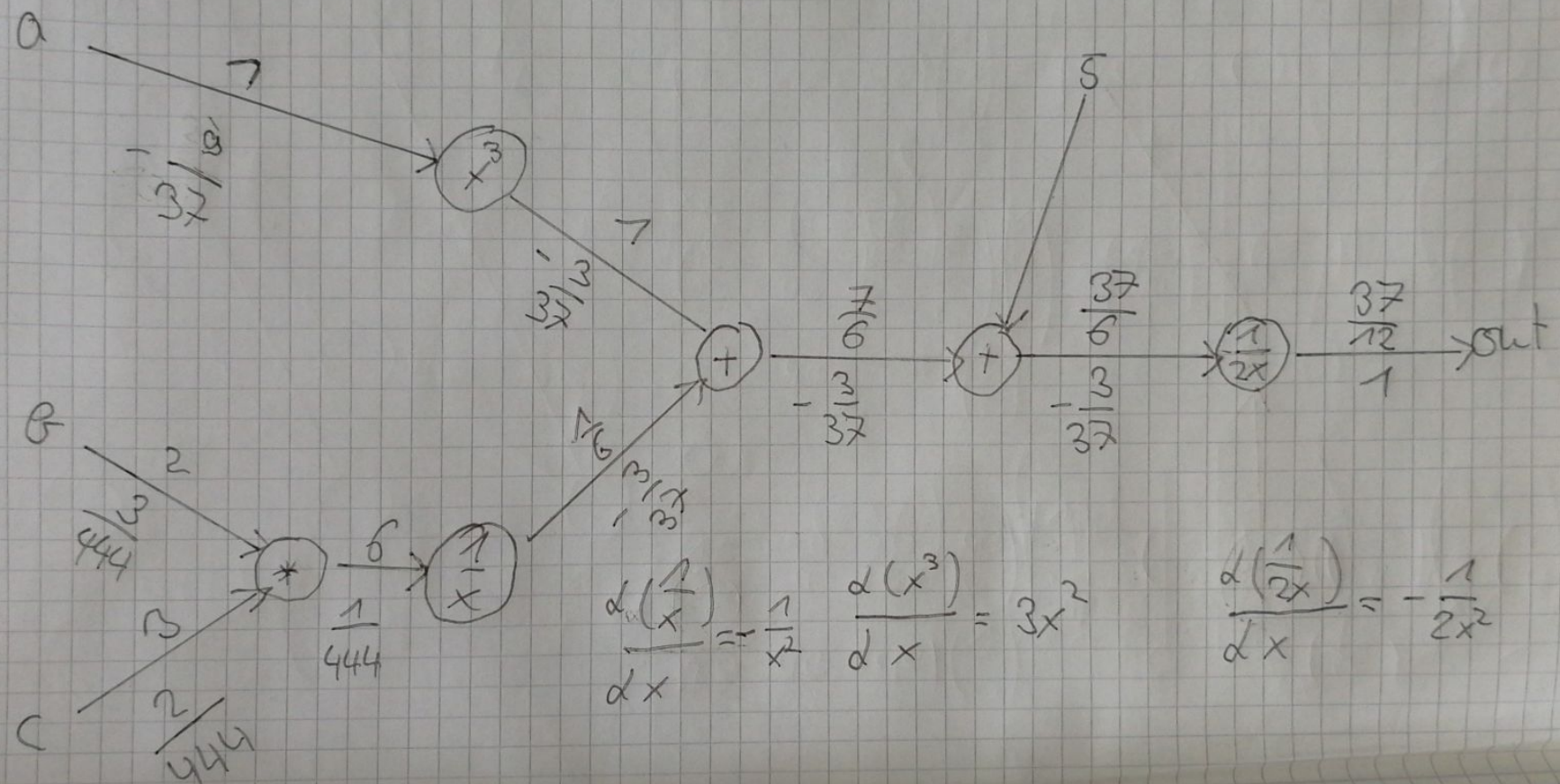
a = 1 b = 2 c = 3



$$\frac{d\left(\frac{1}{x}\right)}{dx} = -\frac{1}{x^2} \qquad \frac{d(x^3)}{dx} = 3x^2 \qquad \frac{d\left(\frac{1}{2x}\right)}{dx} = -\frac{1}{2x^2}$$

$$= \begin{pmatrix} 10 & -20 & 20 & -40 \\ 20 & -40 & 0 & 0 \end{pmatrix} \begin{pmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix} = \begin{pmatrix} -10 & 10 & -50 \\ 20 & -20 & -20 \end{pmatrix} \qquad g(g_n) = \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}$$