

$$\begin{aligned} \frac{\partial L}{\partial a} &= \frac{\partial L}{\partial P_1} \cdot \frac{\partial P_1}{\partial a} \quad a \quad \boxed{-21-160} \quad \frac{\partial L}{\partial P_1} = \frac{\partial L}{\partial S_1} \cdot \frac{\partial S_1}{\partial P_1} \\ \frac{\partial L}{\partial b} &= \frac{\partial L}{\partial P_4} \cdot \frac{\partial P_4}{\partial b} \quad b \quad \boxed{8140} \quad \frac{\partial L}{\partial P_4} = \frac{\partial L}{\partial S_4} \cdot \frac{\partial S_4}{\partial P_4} \\ \frac{\partial L}{\partial c} &= \frac{\partial L}{\partial P_2} \cdot \frac{\partial P_2}{\partial c} \quad c \quad \boxed{81400} \quad \frac{\partial L}{\partial P_2} = \frac{\partial L}{\partial S_2} \cdot \frac{\partial S_2}{\partial P_2} \\ \frac{\partial L}{\partial d} &= \frac{\partial L}{\partial P_2} \cdot \frac{\partial P_2}{\partial d} \quad d \quad \boxed{-51-160} \quad \frac{\partial L}{\partial P_2} = \frac{\partial L}{\partial S_2} \cdot \frac{\partial S_2}{\partial P_2} \\ \frac{\partial L}{\partial e} &= \frac{\partial L}{\partial P_3} \cdot \frac{\partial P_3}{\partial e} \quad e \quad \boxed{3142} \quad \frac{\partial L}{\partial P_3} = \frac{\partial L}{\partial S_3} \cdot \frac{\partial S_3}{\partial P_3} \\ \frac{\partial L}{\partial f} &= \frac{\partial L}{\partial P_3} \cdot \frac{\partial P_3}{\partial f} \quad f \quad \boxed{21-60} \quad \frac{\partial L}{\partial P_3} = \frac{\partial L}{\partial S_3} \cdot \frac{\partial S_3}{\partial P_3} \end{aligned}$$

Diagram showing the flow of partial derivatives and their values:

- $\frac{\partial L}{\partial P_1} = \frac{\partial L}{\partial S_1} \cdot \frac{\partial S_1}{\partial P_1} \rightarrow P_1 \quad \boxed{-161-20}$
- $\frac{\partial L}{\partial P_4} = \frac{\partial L}{\partial S_4} \cdot \frac{\partial S_4}{\partial P_4} \rightarrow P_4 \quad \boxed{501-20}$
- $\frac{\partial L}{\partial P_2} = \frac{\partial L}{\partial S_2} \cdot \frac{\partial S_2}{\partial P_2} \rightarrow P_2 \quad \boxed{-401-20}$
- $\frac{\partial L}{\partial P_3} = \frac{\partial L}{\partial S_3} \cdot \frac{\partial S_3}{\partial P_3} \rightarrow P_3 \quad \boxed{61-20}$
- $\frac{\partial L}{\partial S_1} = \frac{\partial L}{\partial S_2} \cdot \frac{\partial S_2}{\partial S_1} \rightarrow S_1 \quad \boxed{-561-20}$
- $\frac{\partial L}{\partial S_2} = \frac{\partial L}{\partial S_3} \cdot \frac{\partial S_3}{\partial S_2} \rightarrow S_2 \quad \boxed{-501-20}$
- $\frac{\partial L}{\partial S_3} = \frac{\partial L}{\partial S_4} \cdot \frac{\partial S_4}{\partial S_3} \rightarrow S_3 \quad \boxed{-601-20}$
- $\frac{\partial L}{\partial S_4} = \frac{\partial L}{\partial S_5} \cdot \frac{\partial S_5}{\partial S_4} \rightarrow S_4 \quad \boxed{-101-20}$
- $\frac{\partial L}{\partial S_5} = \frac{\partial L}{\partial S_6} \cdot \frac{\partial S_6}{\partial S_5} \rightarrow S_5 \quad \boxed{1001-1}$

- * $P_1 = a \cdot b$
- * $P_2 = c \cdot d$
- * $P_3 = e \cdot f$
- * $S_1 = P_1 + P_2$
- * $S_2 = S_1 + P_3$
- * $S_3 = S_2 + g$
- * $V_1 = -1$
- * $P_4 = y \cdot V_1$
- * $S_4 = P_4 + S_3$
- * $L = S_4^2$