



Find the potential difference $V_A - V_B$.

- A) $V_A - V_B = \mathcal{E}_2 + \mathcal{E}_1 + R_1 I_1$
- B) $V_A - V_B = \mathcal{E}_2 - I_2 R_2 + \mathcal{E}_1 - R_1 I_1$
- C) $V_A - V_B = \mathcal{E}_2 + I_2 R_2 - I_3 R_3$
- D) $V_A - V_B = \mathcal{E}_2 + I_3 R_3$
- E) $V_A - V_B = \mathcal{E}_2 + I_2 R_2 + R_1 I_1$

Convention 1: $A \xrightarrow{\quad \mathcal{E} \quad} B$ $\Delta V = V_B - V_A = +\mathcal{E}$

Convention 2: $C \xrightarrow{i} R \rightarrow D$ $\Delta V = V_D - V_C = -iR$

For loop $BDEA$

$$\begin{aligned} V_A - V_B &= \mathcal{E}_2 - I_2 R_2 + I_3 R_3 \\ &= \mathcal{E}_2 + I_3 R_3, \end{aligned}$$

since $I_2 = 0$.

Answer **D**.