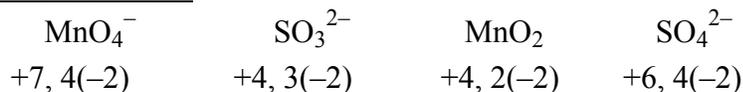


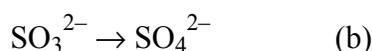
Balance the reaction $\text{MnO}_4^- (\text{aq}) + \text{SO}_3^{2-} (\text{aq}) \rightarrow \text{MnO}_2 (\text{s}) + \text{SO}_4^{2-} (\text{aq})$ in basic solution

Oxidation states:



Therefore, Mn gets reduced (+7 \rightarrow +4) and S gets oxidized (+4 \rightarrow +6)

1) Write down the half reactions (incomplete) :

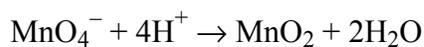


2) These are already balanced in Mn and S

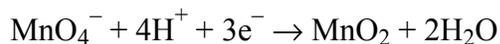
3) Balance O in (a) by adding H_2O 's to the right-hand-side



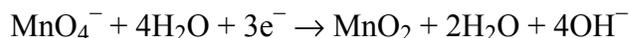
4) Balance H by adding H^+ to the left-hand-side



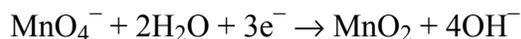
5) Balance charge by adding electrons



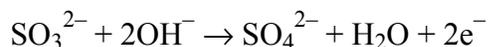
6) Convert to basic solution by replacing the H^+ with H_2O and adding the same number of OH^- ions to the other side



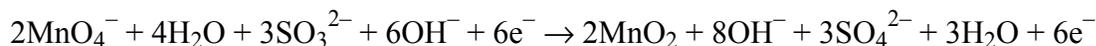
7) Cancel any extra H_2O 's



Do the same with the sulfur half reaction to get:



8) Combine the two by multiplying the Mn rxn by 2 and the S rxn by 3 and add:



9) Canceling yields:

