1) $BrO_3^- + H^+ \rightleftharpoons HBrO_3$

$HBrO_3 + H^+ \rightleftharpoons H_2BrO_3^+$

$Br^- + H_2BrO_3^+ \longrightarrow Br_2O_2 + H_2O$

$Br_2O_2 + 4H^+ + 4Br^- \longrightarrow 3Br_2 + 2H_2O$

$5Br^- + BrO_3^- + 6H^+ \longrightarrow 3Br_2 + 3H_2O$ ✓

2) RDS: $Br^- + H_2BrO_3^+ \xrightarrow{k_3} Br_2O_2 + H_2O$

$\text{rate} = k_3[Br^-][H_2BrO_3^+]$

→ an intermediate, not a reactant, i.e.: Br^-, BrO_3^-, H^+ Make a substitution

$k_2[HBrO_3][H^+] = k_{-2}[H_2BrO_3^+]$

$[H_2BrO_3^+] = \frac{k_2}{k_{-2}}[HBrO_3][H^+]$

$\text{rate} = k_3[Br^-]\frac{k_2}{k_{-2}}[HBrO_3][H^+]$

→ another intermediate another substitution

$k_1[BrO_3^-][H^+] = k_{-1}[HBrO_3]$

$[HBrO_3] = \frac{k_1}{k_{-1}}[BrO_3^-][H^+]$

$\text{rate} = k_3[Br^-]\frac{k_2}{k_{-2}}\cdot\frac{k_1}{k_{-1}}\cdot[BrO_3^-][H^+][H^+]$

$\text{rate} = k_3\cdot\frac{k_2}{k_{-2}}\cdot\frac{k_1}{k_{-1}}[Br^-][BrO_3^-][H^+]^2$

or

$\text{rate} = k_{observed}[Br^-][BrO_3^-][H^+]^2$