Name _____ Date _____ Class _____

SECTION 20.3 BALANCING REDOX EQUATIONS

1. Balance these equations using the oxidation-number-change method.
   - **a.** $C + H_2SO_4 \rightarrow CO_2 + SO_2 + H_2O$
   - **b.** $H_2S + HNO_3 \rightarrow S + NO + H_2O$
   - **c.** $HNO_3 + HI \rightarrow NO + I_2 + H_2O$
   - **d.** $Sb + HNO_3 \rightarrow Sb_2O_5 + NO + H_2O$
   - **e.** $KMnO_4 + HCl \rightarrow MnCl_2 + Cl_2 + H_2O + KCl$
   - **f.** $KIO_4 + KI + HCl \rightarrow KCl + I_2 + H_2O$
   - **g.** $Zn + Cr_2O_7^{2-} + H^+ \rightarrow Zn^{2+} + Cr^{3+} + H_2O$
2. Write half-reactions for the oxidation and reduction processes for each of the following reactions.
   - **a.** $Fe^{2+} + MnO_4^- \rightarrow Fe^{3+} + Mn^{2+}$ (acidic solution)
   - **b.** $Sn^{2+} + IO_3^- \rightarrow Sn^{4+} + I^-$ (acidic solution)
   - **c.** $S^{2-} + NO_3^- \rightarrow S + NO$ (acidic solution)
   - **d.** $Mn^{2+} + H_2O_2 \rightarrow MnO_2 + H_2O$ (basic solution)
3. Balance these reactions using the half-reaction method.
   - **a.** $Zn + HgO \rightarrow ZnO_2^{2-} + Hg$ (basic solution)
   - **b.** $Fe^{2+} + MnO_4^- \rightarrow Fe^{3+} + Mn^{2+}$ (acidic solution)
   - **c.** $Sn^{2+} + IO_3^- \rightarrow Sn^{4-} + I^-$ (acidic solution)
   - **d.** $S^{2-} + NO_3^- \rightarrow S + NO$ (acidic solution)
   - **e.** $Mn^{2+} + H_2O_2 \rightarrow MnO_2 + H_2O$ (basic solution)
   - **f.** $CrO_2 + ClO^- \rightarrow CrO_4^{2-} + Cl^-$ (basic solution)