SAMPLE PROBLEM B

Write the formula and give the name for the compound formed by the ions Cr^{3+} and F^-.

SOLUTION

Write the symbols for the ions side by side. Write the cation first.

$$Cr^{3+}\ F^-$$

Cross over the charges to give subscripts.

$$Cr_1^{3+}\ F_3^-$$

Check the subscripts and write the formula.

The subscripts are correct because they give charges of $1 \times 3+ = 3+$ and $3 \times 1- = 3-$. The largest common factor of the subscripts is 1, so the smallest whole-number ratio of the ions is 1:3. The formula is therefore CrF_3. As **Table 1** shows, chromium forms more than one ion. Therefore, the name of the 3+ chromium ion must be followed by a Roman numeral indicating its charge. The compound's name is chromium(III) fluoride.

PRACTICE *Answers in Appendix E*

1. Write the formula and give the name for the compounds formed between the following ions:
   - **a.** Cu^{2+} and Br^-
   - **b.** Fe^{2+} and O^{2-}
   - **c.** Pb^{2+} and Cl^-
   - **d.** Hg^{2+} and S^{2-}
   - **e.** Sn^{2+} and F^-
   - **f.** Fe^{3+} and O^{2-}
2. Give the names for the following compounds:
   - **a.** CuO
   - **b.** CoF_3
   - **c.** SnI_4
   - **d.** FeS

extension
Go to **go.hrw.com** for more practice problems that ask you to write formulas for ionic compounds.
Keyword: HC6FRMX

Compounds Containing Polyatomic Ions

Table 2 on the next page lists some common polyatomic ions. Most are negatively charged and most are **oxyanions**—*polyatomic ions that contain oxygen.* Some elements can combine with oxygen to form more than one type of oxyanion. For example, nitrogen can form NO_3^- or NO_2^-. The name given a compound containing such an oxyanion depends on the number of oxygen atoms in the oxyanion. The name of the ion with the greater number of oxygen atoms ends in *-ate.* The name of the ion with the smaller number of oxygen atoms ends in *-ite.*

NO_2^-	NO_3^-
nitrite	nitrate

Sometimes, an element can form more than two types of oxyanions. In this case, an anion that has one fewer oxygen atom than the *-ite* anion