**TABLE 3.15 Some General Proof Strategies**

| If the assertion . . . | Then try . . . |
|---|---|
| claims something is true for all integers $n \geq n_0$ | mathematical induction or complete induction |
| is stated explicitly or implicitly as an implication | direct; indirect; contradiction |
| contains an existential quantifier | a constructive proof; a nonconstructive proof |
| contains a universal quantifier | finding a counterexample; the choose method |
| contains the phrase "if and only if" | to prove the two implications separately; to produce a sequence of equivalent statements linking the two sides of the biconditional |
| is stated as an equivalence | to look for a complete set of implications that are relatively easy to prove |
| can be easily split into a collection of independent assertions | proof by cases |
| is an implication with a true conclusion | trivial proof |
| is an implication with a false hypothesis | trivial (vacuous) proof |
| is about membership in a set | direct proof: verify that the element satisfies the set membership requirements |
| asserts one set is a subset of another | to show that a generic element of the first set is also a member of the second set |
| asserts the equality of two sets | to show that each set is a subset of the other; to use a sequence of reversible statements with the fundamental set properties and other theorems |