

As an example of reversing a vector in problem solving, recall, from Section 1.1.3, the vector $a = (25; 32; 20; 22; 28)$ that represents the ages of five patients. Suppose you have a method for sorting the components of a vector in increasing order, but that you now want to sort the components in decreasing order. Rather than writing a new sorting procedure, you can use the existing one by performing the following steps:

- Step 1. Reverse the vector a to obtain $\bar{a} = (\bar{25}; \bar{32}; \bar{20}; \bar{22}; \bar{28})$.
- Step 2. Sort the vector \bar{a} in increasing order: $(\bar{32}; \bar{28}; \bar{25}; \bar{22}; \bar{20})$.
- Step 3. Reverse the vector in Step 2 to obtain $(32; 28; 25; 22; 20)$, which is the original vector sorted in decreasing order.

Mathematical Thinking Process

The three steps just described for sorting the components of a vector in decreasing order are an example of a numerical-method solution, which is a solution obtained from the problem data by performing a sequence of computations.