

Problem-Solving Strategy: Solve a Simpler Problem

One of the strategies you can use to solve a problem is to **solve a simpler problem**. To use this strategy, first solve a simpler or more familiar case of the problem. Then use the same concepts and relationships to solve the original problem.

Example 1 Find the sum of the numbers 1 through 500.

Consider a simpler problem. Find the sum of the numbers 1 through 10. Notice that you can group the addends into partial sums as shown below.

$$1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = 55$$

The number of sums is 5, or half the number of addends.

Each partial sum is 11, the sum of the first and last numbers.

The sum is 5×11 or 55.

Use the same concepts to find the sum of the numbers 1 through 500.

$$1 + 2 + 3 + \dots + 499 + 500 = 250 \times 501 = 125,250$$

Multiply half the number of addends, 250, by the sum of the first and last numbers, 501.

A similar problem-solving strategy is to use subgoals.

Example 2 Two workers can make two chairs in two days. How many chairs can 8 workers working at the same rate make in 20 days?

First find how many chairs each worker can make in two days.

Divide 2 chairs by 2 workers. $\longrightarrow 2 \div 2 = 1$

So, each worker can make 1 chair in 2 days. To find how many chairs each worker can make in 20 days, divide 20 by 2. $\longrightarrow 20 \div 2 = 10$

Now find how many chairs 8 workers can make by multiplying 8 by 10. $\longrightarrow 8 \times 10 = 80$

So, 8 workers can make 80 chairs in 20 days.