

Skill Set 7: Work Backward

Working backward is a strategy that uses a problem's final answer to find what the problem begins with. Very often, you can trace back the steps and reverse the operations to find the answer.

Example:

In a school library, 40% of the books are science books, 80% of the remaining books are English books, and the remaining 240 books are math books. What is the total number of books in the library?

Think

- In the end: 20% of the remaining books \rightarrow 240
- Work backward to find the number of remaining books and then the total number of books.

Solve

$$100\% - 80\% = 20\%$$

$$20\% \text{ of remaining books } \rightarrow 240$$

$$100\% \text{ of remaining books } \rightarrow \frac{240}{20} \times 100 = 1,200$$

$$100\% - 40\% = 60\%$$

$$60\% \text{ of all books } \rightarrow 1,200$$

$$100\% \text{ of all books } \rightarrow \frac{1,200}{60} \times 100 = 2,000$$

Answer The total number of books in the library is **2,000**.

Give it a try!

In January, Shane spent 30% of his salary on a new cell phone and used 40% of the balance to take a trip. He then saved $\frac{1}{3}$ of his remaining salary, which amounted to \$252. What was Shane's monthly salary?

Think

Work backward to find Shane's remaining salary and then his full monthly salary.

Solve

$$\text{remaining salary } \rightarrow \$ \underline{\quad} \times \underline{\quad} = \$ \underline{\quad}$$

$$100\% - \underline{\quad}\% = \underline{\quad}\%$$

$$\underline{\quad}\% \text{ of balance salary } = \$ \underline{\quad}$$

$$100\% \text{ of balance salary } = (\underline{\quad} \div \underline{\quad}) \times 100 = \$ \underline{\quad}$$

$$\underline{\quad}\% \text{ of full monthly salary } \rightarrow \$ \underline{\quad}$$

$$100\% \text{ of full monthly salary } \rightarrow (\underline{\quad} \div \underline{\quad}) \times 100 = \$ \underline{\quad}$$

Answer Shane's monthly salary was _____.

(Answer: \$1,800)

Practice: Work Backward

1. Porchia had some marbles in box A and box B. She moved 25 marbles from box A to box B. She then moved 40 marbles from box B back to box A. In the end, 150 marbles were left in box A, which was twice the number of marbles in box B. How many marbles were in each box to begin with?

 Think

 Solve

 Answer

2. Maria had 240 colored tiles in bag X and bag Y. She moved $\frac{3}{5}$ of the tiles from bag X to bag Y. She then moved $\frac{1}{2}$ of the tiles from bag Y back to bag X. In the end, she had twice as many tiles in bag X as she had in bag Y. How many tiles were in each bag to begin with?

 Think

 Solve

 Answer