

# Study Guide and Intervention

## Problem-Solving Investigation: Work Backward

You may need to work backward to solve a problems.

- Explore** • Determine what information is given in the problem and what you need to find.
- Plan** • Select a strategy including a possible estimate.
- Solve** • Solve the problem by carrying out your plan.
- Check** • Examine your answer to see if it seems reasonable.

### Example 1

Mari put money in her savings account each week. She put a certain amount of money in the bank on the first week. On the second week she put twice as much money in the bank as the first week. On the third week, she put \$40 less in the bank than on the second week. On the fourth week, she put \$20 more in the bank than on the third week. Mari put \$200 in the bank on the fourth week. How much money did Mari put in the bank on the first week?

**Explore** You know that Mari put \$200 in the bank on the fourth week. You need to know how much money she put in the bank on the first week.

**Plan** Start with the amount she put in the bank on the last week and work backward.

**Solve** Start with the \$200 Mari put in the bank on the fourth week.

| Fourth Week                            |                               | Third Week                              |                          | Second Week                              |                             | First Week |
|--|-------------------------------|---|--------------------------|--|-----------------------------|------------|
| \$200                                  | −\$20                         | \$180                                   | +\$40                    | \$220                                    | ÷ 2                         | \$110      |
| This is \$20 more than the third week. | Work backward. Subtract \$20. | This is \$40 less than the second week. | Work backward. Add \$40. | This is twice as much as the first week. | Work backward. Divide by 2. |            |

**Check** Start with \$110 for the first week and work forward. On the second week she deposited twice as much money in the bank than on the first week, which is \$220. On the third week, she deposited \$40 less than the second week, which is \$180. On the fourth week she deposited \$20 more than on the third week, or \$200. This is what you know she deposited on the fourth week.

### Exercises

Use the work backward strategy to solve each problem.

- SHOPPING** Jack spent a total of \$87.58 when he went shopping for camping supplies. He spent \$36.89 on food, \$23.24 on a sleeping bag, and bought lunch. When he got home, he had \$15.70. How much did he spend on lunch?
- AGE** Sam is 4 years older than Eliot. Eliot is 9 years younger than Xing. Xing is 3 years older than Damien. If Damien is 15 years old, how old are each of the other boys?

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## Percent and Estimation

You can use compatible numbers to estimate a percent of a number. **Compatible numbers** are two numbers that are easy to divide mentally.

### Example 1 Estimate 35% of 60.

35% is about  $33\frac{1}{3}\%$  or  $\frac{1}{3}$ .  $\frac{1}{3}$  and 60 are compatible numbers.

$\frac{1}{3}$  of 60 is 20.

So, 35% of 60 is about 20.

### Example 2 Estimate what percent corresponds to 23 out of 59.

$$\frac{23}{59} \approx \frac{24}{60} \text{ or } \frac{2}{5}$$

23 is about 24, and 59 is about 60.

$$\frac{2}{5} = 40\%$$

So, 23 out of 59 is about 40%.

### Exercises

#### Estimate.

- 11% of 60
- 24% of 36
- 81% of 25
- 19% of 41
- 32% of 66
- 67% of 44

#### Estimate each percent.

- 7 out of 15
- 6 out of 23
- 5 out of 51
- 8 out of 35
- 13 out of 17
- 17 out of 26