

Problem-Solving Investigation: Work Backward

By working backward from where you end to where you began, you can solve problems. Use the four step problem solving model to stay organized when working backward.

Example 1

Jonah put half of his birthday money into his savings account. Then he paid back the \$10 that he owed his brother for dance tickets. Lastly, he spent \$3 on lunch at school. At the end of the day he was left with \$12. How much money did Jonah receive for his birthday?

Understand	You know that he had \$12 left and the amounts he spent throughout the day. You need to find out how much money he received for his birthday.														
Plan	Start with the amount of money he was left with and work backward.														
Solve	<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 80%;">He had \$12 left.</td> <td style="text-align: right;">12</td> </tr> <tr> <td>Undo the \$3 he spent on lunch.</td> <td style="text-align: right;"><u>+3</u></td> </tr> <tr> <td></td> <td style="text-align: right;">15</td> </tr> <tr> <td>Undo the \$10 he gave back to his brother</td> <td style="text-align: right;"><u>+10</u></td> </tr> <tr> <td></td> <td style="text-align: right;">25</td> </tr> <tr> <td>Undo the half put into his savings account</td> <td style="text-align: right;"><u>×2</u></td> </tr> <tr> <td>So, Jonah received \$50 for his birthday.</td> <td style="text-align: right;">50</td> </tr> </tbody> </table>	He had \$12 left.	12	Undo the \$3 he spent on lunch.	<u>+3</u>		15	Undo the \$10 he gave back to his brother	<u>+10</u>		25	Undo the half put into his savings account	<u>×2</u>	So, Jonah received \$50 for his birthday.	50
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Check	Assume that Jonah receive \$50 for his birthday. After putting half into his savings account he had $\$50 \div 2$ or \$25. Then he gave \$10 to his brother for dance tickets, so he had $\$25 - \10 or \$15. Lastly, he spent \$3 on lunch at school, so he had $\$15 - \3 , or \$12. So, our answer of \$50 is correct.														

Exercises

Solve each problem by using the *work backward* strategy.

- On Monday everyone was present in Mr. Miller's class. At 12:00, 5 students left early for doctors' appointments. At 1:15, half of the remaining students went to an assembly. Finally, at 2:00, 6 more students left for a student council meeting. At the end of the day, there were only 5 students in the room. Assuming that no students returned after having left, how many students are in Mr. Miller's class?
- Jordan was trading baseball cards with some friends. He gave 15 cards to Tommy and got 3 back. He gave two thirds of his remaining cards to Elaine and kept the rest for himself. When he got home he counted that he had 25 cards. How many baseball cards did Jordan start with?

Skills Practice

Problem-Solving Investigation: Work Backward

Solve. Use the *work backward* strategy

- 1. GOVERNMENT** There are 99 members in the Ohio House of Representatives. All of them were present when a vote was taken on a piece of legislation. If 6 of them did not vote, and 13 more voted “yes” than voted “no,” how many “no” votes were there?
- 2. MONEY** Jessie and Amar eat lunch at a restaurant and their bill is \$21.65. Amar gives the cashier a coupon for \$6 off their bill, and also hands the cashier two bills. If he receives \$4.35 in change, what were the denominations of the two bills he gave the cashier?
- 3. AGE** Justine is 13 years younger than her uncle Stewart. Stewart is 18 years older than Justine’s sister, Hana. Hana’s mother is 8 years older than Stewart, and 28 years older than her youngest child, Jared. If Jared is 12 years old, how old is Justine?
- 4. NUMBER THEORY** A number is divided by 6. Then 7 is added to the divisor. After dividing by 4, the result is 4. What is the number?
- 5. COMPACT DISCS** Carmella borrowed half as many CDs from the library as her friend Ariel. Ariel borrowed 2 more than Juan, but four less than Sierra. Sierra borrowed 12 CDs. How many did each person borrow?
- 6. TIME** Ashish needs to leave for the bus stop 15 minutes earlier than his friend Rami. Rami leaves five minutes later than Leann, but 10 minutes earlier than Raphael. If Raphael leaves for the bus stop at 8:15, what time does Ashish need to leave?