

**MAIN IDEA:** Solve problems by working backward.

## P.S.I. TEAM +

## e-Mail: WORK BACKWARD

LOURDES: The baseball team sold twice as many adult tickets to Friday's game as student tickets. The number of student tickets sold was eighteen more than the number of seats that were not sold. Twenty-one seats were not sold.

YOUR MISSION: **Work backward** to find the total number of tickets that could be sold in all.



<b>Understand</b>	You know twice as many adult tickets were sold as student tickets. You know that 18 more student tickets were sold than the number of seats that were not sold. You know that 21 seats were not sold. You need to find how many total tickets could be sold.
<b>Plan</b>	Begin with the number of seats that were not sold. By working backward, find the number of student tickets and then the number of adult tickets. The sum of all of these will give the total number of tickets that could be sold.
<b>Solve</b>	$21$ number of seats that were not sold $21 + 18 = 39$ number of student tickets $39 \times 2 = 78$ number of adult tickets  The sum of 21, 39, and 78 is 138. So, a total of 138 tickets could be sold.
<b>Check</b>	Begin with 138 tickets. $138 - 78 - 39 = 21$ . Since 78 is twice as much as 39, and 39 is 18 more than 21, the answer is correct. ✓

## Analyze The Strategy

1. What is the best way to check your solution when using the *work backward* strategy?
2. **WRITING IN MATH** Explain when you would use the *work backward* strategy to solve a problem.

For Exercises 3–5, solve using the *work backward* strategy.

- EXERCISE** David swims and lifts weights for a total of 35 minutes at the gym before school. He spends 10 minutes getting ready for school after he works out. It takes him 15 minutes to get to the gym from his house and 20 minutes to get to school from the gym. If he needs to be at school at 8:15 A.M., what time should he leave his house in the morning to get to the gym?
- AGE** Marcia is five years younger than her sister, Lynn. Lynn is half as old as her aunt Jen. If Jen is 28, how old is Marcia?
- NUMBER SENSE** A number is multiplied by 4, and then 6 is added to the product. The result is 18. What is the number?

Use any strategy to solve Exercises 6–14. Some strategies are shown below.

**PROBLEM-SOLVING STRATEGIES**

- Make a table.
- Work backward.
- Act it out.

- ROLLER COASTERS** The list shows how many times each of 20 students rode a roller coaster at an amusement park one day.

Number of Times Rode Roller Coaster									
5	10	0	12	8	7	2	6	4	1
0	14	3	11	5	9	13	8	6	3

How many more students rode a roller coaster 5 to 9 times than 10 to 14 times?

- CAMERAS** Francesca saved 13 new pictures on her digital camera's memory card and deleted 32 pictures. If there are now 108 pictures, how many pictures had she saved originally?

- NUMBER SENSE** What is the least positive number that you can divide by 7 and get a remainder of 4, divide by 8 and get a remainder of 0, and divide by 9 and get a remainder of 4?
- CABLE** In 1977, there were 12,168,450 cable television subscribers. By 2003, there were 73,365,880 subscribers. How many more cable television subscribers were there in 2003 than in 1977?
- COMETS** Halley's comet is visible from Earth approximately every 76 years. If the next scheduled appearance is in 2062, when was the last visit by Halley's comet?
- RECIPES** A fruit punch recipe calls for 8 cups of orange juice. If there are 4 cups in one quart, how many quarts of juice are needed for the recipe?
- NUMBER SENSE** A number is subtracted from 20. If the difference is divided by 3 and the result is 4, what is the number?
- COMPUTERS** A megabyte is equal to 1,000 kilobytes. A kilobyte is equal to 1,024 bytes. If a byte is equal to 8 bits, how many bits are in a megabyte?
- PARKING** The diagram shows the number of parking spaces available in several different parking lots on a college campus. Find the mean number of parking spaces available in each lot.

