

Working Backwards

Sometimes you need to work backwards to solve a problem.

Kim borrowed some books, tapes, and videos from the library. She got twice as many books as tapes, and 2 more tapes than videos. She borrowed 2 videos. How many items did Kim borrow?

Start with what you know and work backwards.

$$2 \text{ videos} + 2 = 4 \text{ tapes}$$

$$2 \times 4 \text{ tapes} = 8 \text{ books}$$

$$2 \text{ videos} + 4 \text{ tapes} + 8 \text{ books} = 14 \text{ items}$$

Work backwards to solve each problem. You may use a calculator.

1. Four friends checked out a total of 104 books. Newt took out half as many as Jenna. Sarita checked out 5 more books than Sheerab, who borrowed twice as many as Jenna. How many books did each person check out?

2. Jaime paid \$2.50 in library fines using only nickels and dimes. He used 5 more nickels than dimes. How many of each coin did Jaime use to pay the fine?

3. On Saturday the librarian noted that a total of \$85.00 was collected in library fines. Three times as much money was collected in the morning as in the afternoon. How much money was collected during each part of the day?

4. The library has 3 floors. The second floor has one and a half times as many books as the first floor. The third floor has twice as many books as the first floor. There are 18,000 books on all three floors. How many books are on each floor?

5. Larry's family made a donation to the library. His mom gave half as much as Larry. His dad gave 5 times as much as Larry's sister did. The sister gave \$10 less than Larry. Larry gave \$15. How much did the family donate?

On Your Own

Today the librarian ordered 50 books. There were 24 more nonfiction books ordered than fiction. How many of each type were ordered?

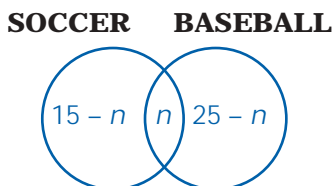
On another sheet of paper, explain how you found your answer.

Using a Venn Diagram

A Venn diagram is a way to represent relationships among sets of numbers.

There are a total of 32 students on the soccer and baseball teams. Of them, 15 play soccer and 25 play baseball. How many students play both sports?

Let n represent the number of students who play both sports.



Write an equation to help you solve the problem.

$$(15 - n) + n + (25 - n) = 32$$

$$40 - 2n + n = 32$$

$$40 - n = 32$$

$$8 = n$$

Draw a Venn diagram to represent each problem. Then write an equation to solve it.

1. The 45 members of the computer club held a barbecue. There were 29 members who ate hot dogs and 30 who ate hamburgers. Assuming that every person ate at least one hot dog or hamburger, how many people must have eaten both?

2. The book club surveyed 100 people about what they read in their spare time. There were 58 people who said they read fiction and 62 who said they read nonfiction. How many of those people must read both fiction and nonfiction?

3. The foreign language club has 225 members. Of them, 150 members take French and 163 take Spanish. If those two languages are the only foreign languages offered at the school, how many students must be taking both languages?

4. There are 92 instrumentalists who play in the school band and orchestra. There are 62 people in the band and 87 in the orchestra. How many instrumentalists play in both the band and the orchestra?

On Your Own

Look at problem 4 again. If every member of the band was also a member of the orchestra, how many instrumentalists would there be in all?

On another sheet of paper, explain your answer and draw a Venn diagram to show the relationship of the sets.