

Deductive and Hypothetical Thinking

The day before yesterday you did not get home until yesterday; yesterday you did not get home until today. If today you do not get home until tomorrow, you will find that I have left yesterday.

- The mental reasoning needed here is fundamental in solving many problems
 - Comprehend verbal statements
 - Move in some dimension
 - Think backward through a sequence to see where a movement began

Simple Problems

Making a diagram helps with these.

- Suppose Valentine's Day is 3 days after Friday. What day is Valentine's day?
- Suppose Lincoln's birthday is 4 days before Thursday. What day is Lincoln's Birthday?
- Suppose Christmas is 2 days before Wednesday?
 - What day is Christmas?
 - What day is 4 days before Christmas?

Slightly Harder

- Saturday is 5 days before Labor day. What day is Labor day?
- Suppose Christmas is 2 days after Thursday. What day is Christmas?
- Suppose Thursday is 2 days after Christmas. What day is Christmas?

Deduction

- Today is Thursday. What is 2 days after tomorrow?
- Yesterday was Monday. What is 4 days after tomorrow?
- Today is Saturday. What is the day after 4 days before tomorrow?

Break It Down

Many math problems are solved by breaking them into parts. Your brain can only hold so much at once.

- Today is Monday. What is 1 day after 3 days before yesterday?
 - Use a diagram, and take it one step at a time.

Examples

- Yesterday was Tuesday. What is 2 days before 4 days after tomorrow?
- Tomorrow is Sunday. What is 2 days after 3 days before yesterday?
- Yesterday was Saturday. What is 4 days before 7 days after 2 days before today?
- Today is Monday. What is 3 days after 2 days before 6 days after 5 days after tomorrow?

Subtle Variations

- What is the difference between these two questions?
 - Today is Sunday. What is 3 days after today?
 - Sunday is 3 days after today. What is today?

More Examples

- Friday is 3 days before yesterday. What is tomorrow?
- Monday is 5 days before 2 days after yesterday. What is yesterday?
- Wednesday is 6 days before 2 days after tomorrow. What is tomorrow?

Mixed Problems

- Yesterday was Friday. What is the third letter in the day after tomorrow?
- If 6 days ago was Wednesday, what is the second letter after the second letter in 2 days after tomorrow?

Math-like Problems

- A man divides \$1622.50 among four persons so that the first has \$40 more than the second, the second \$60 more than the third, and the third \$87.50 more than the fourth. How much did the fourth person receive?
- A man bequeathes to his wife $\frac{1}{3}$ of his estate; to his daughter, $\frac{1}{5}$ of it; to his son, $\frac{1}{2}$ of the daughter's share. He divides the remainder equally between a hospital and a public library. What part is received by the hospital?

Mathematical Word Problems

- A lot of word problems involve math.
 - That just means they involve (simple) numerical relationships.
 - Its all about setting up the relationships, not about the arithmetic.
- Process:
 - Be concerned about accuracy
 - Proceed step-by-step
 - Restate and subvocalize

Old Problem

Sally loaned \$7 to Betty. But Sally borrowed \$15 from Estella and \$32 from Joan. Moreover, Joan owes \$3 to Estella and \$7 to Betty. One day the women got together at Betty's house to straighten out their accounts. Which woman left with \$18 more than she came with?

Hint: Make a diagram and use arrows to show which person has to return money to another person. Show the direction in which the money must be returned.

A Ratio Problem

A train can travel 10 miles in 4 minutes. How far will it travel in 14 minutes?

Alternative Solutions

- $14/4 = 3.5$, so there are 3.5 (4-minute) units. The train goes 10 miles in each unit, so $3.5 \times 10 = 35$.
- Ratios: $14/4 = X/10$ so $(14)(10)/4 = X$. $X = 35$.
- How many miles in one minute? $10/4 = 2.5$. So in 14 minutes, $14 \times 2.5 = 35$.

Sample Problems

- Ted's weekly income is \$100.00 less than double Gary's weekly income. If Ted makes \$500.00 a week, what does Gary make?
- Paul makes \$25.00 a week less than the sum of what Fred and Carl together make. Carl's weekly income would be triple Steven's if he made \$50.00 more a week. Paul makes \$285.00 a week and Steven makes \$75.00 a week. How much does Fred make?