

The Guess and Check Method

What do you think of guessing in Mathematics? Many people feel you have to know the one right way to solve a problem to get the right answer. However, educated guessing and estimating can often get you started when you are stuck and don't know where to begin. Let us look at an example.

Example: Rishabh collects hats and T-shirts. He has 4 more T-shirts than hats. Altogether he has a total of 20 T-shirts and hats. How many does he have of each?

We can solve this problem using the 'guess and check' method, using the following steps:

1. Create a table with accurate column heads.
2. Make a guess for a possible number (of T-shirts in this case) that would answer the question.
3. Fill up a row in the table and don't forget to write a comment.
4. If your guess was too high, take another guess with a lower number; if your guess was too low, take another guess with a higher number.
5. Repeat steps 3 and 4 until you narrow down to your answer.

Let us apply these steps in the case of the problem above.

| T-Shirts | Hats (T-Shirts - 4) | Total | Comments (goal is total of 20) |
|----------|---------------------|-------|-----------------------------------|
| 10 | 6 | 16 | too small |
| 16 | 12 | 28 | too big |
| 14 | 10 | 24 | too big |
| 12 | 8 | 20 | just right! |

1. The starting point in each row (number of T-Shirts) is called an 'educated guess'. Why do you think we call these guesses 'educated'?
2. Use the 'guess and check' method to identify two numbers which add up to 72 and where the first number is 8 more than the second number. Don't forget to draw a 'guess and check' table!

Algebra Notes

The above problems are example of '**algebra problems**' where we solve for unknowns. The guess and check tables guide you through the arithmetic you need to do and provide a way to check your work. We could use the table headings to set up algebraic equations to solve these problems. Here is what we would have done in the first example, involving T-shirts and hats.

Let t be the number of T-shirts. Then $t - 4$ will represent the number of hats. We also know that the total is 20. Hence, we can use this information to set up the following algebraic equation.

$$t + t - 4 = 20$$

$$2t - 4 = 20$$

We can add 4 to each side of the equation (and both sides will still remain equal). So:

$$2t - 4 + 4 = 20 + 4$$

$$2t = 24$$

Dividing both sides of the equation by 2, we get:

$$\frac{2t}{2} = \frac{24}{2}$$
$$t = 12$$

So the number of T-shirt is 12 and the number of hats is $t - 4 = 8$.

We can check and see that the total is indeed $12 + 8 = 20$ as stated in the question.

Problems

In the following problems, use the 'guess and check' method with appropriate table headings that help you make educated guesses as you narrow down towards the answers.

Thereafter try and use the information from your table headings to set up algebraic equations for each problem. Solve these equations (find the unknowns) using algebra and check if your answers match the ones you got through the 'guess and check' method.

1. A plate of idlis costs Rs. 21 more than a cup of coffee. Together they cost Rs. 33. How much does each cost?
2. A pen costs Rs. 5 more than a pencil. Together they cost Rs. 20. How much does each cost?
3. A shirt costs one-third the cost of a pair of shoes. A jacket costs twice the cost of the shoes. Altogether these three items cost Rs 2200. How much does each cost?
4. Three times a number is 6 less than 30. What is the number?
5. The first number is 15 less than the second. Their product is 76. What are the numbers?