



Try this.

I am thinking of a number.

If I divide my number by 5, then add 7 to the result, I get 15.

What is my number?

1. Divide my number by 5.
2. Add 7 to the result to get 15.

What is my number?

I can work backwards to undo those two steps.

Try it.

2. Add 7 to the result to get 15.

$$\square + 7 = 15$$

$$15 - 7 = \boxed{8}$$

To find the number that you **added** 7 to to get 15, we **subtract** 7 from 15.  $15 - 7 = 8$ .

1. Divide my number by 5.

$$\square \div 5 = 8$$

That means that when you **divided** your number by 5, you got 8.

$\square \div 5 = 8$

$$8 \times 5 = \boxed{40}$$

So, we can **multiply** 8 by 5 to find your number!

$8 \times 5 = 40$ .

Perfect! You figured out my number.

That's how math beasts solve equations... by undoing operations.\*

Really?

Yep.

I'll show you. Start by turning these sentences into an equation.

1. Divide my number by 5.
2. Add 7 to the result to get 15.

What is my number?

Write an equation. Use  $x$  to represent the unknown number.

\*MATH OPERATIONS ARE THE THINGS WE DO TO NUMBERS, LIKE ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION.



Let's see...

I'll use  $x$  to represent your number.

Dividing your number by 5 gives us  $\frac{x}{5}$ .

1. Divide my number by 5.  $\rightarrow \frac{x}{5}$
  2. Add 7 to the result to get 15.
- What is my number?

Then, we add 7 to the result.

That gives us  $\frac{x}{5} + 7$ .

1. Divide my number by 5.  $\rightarrow \frac{x}{5}$
  2. Add 7 to the result to get 15.  $\rightarrow \frac{x}{5} + 7$
- What is my number?

Dividing your number by 5 and adding 7, we get 15.

$$\text{So, } \frac{x}{5} + 7 = 15.$$

1. Divide my number by 5.  $\rightarrow \frac{x}{5}$
  2. Add 7 to the result to get 15.  $\rightarrow \frac{x}{5} + 7 = 15$
- What is my number?

But, how do we figure out what  $x$  is?

The same way you figured out my number before...

...by working backwards!

Our goal is to *isolate the variable*.

Huh?

That just means we try to get  $x$  by itself on one side of the equation.

$$\frac{x}{5} + 7 = 15$$

How could you solve this equation for  $x$ ?

$x$  is divided by 5, then 7 is added to the result.

To undo the +7, we subtract 7 from both sides of the equation.

Both sides?

$$\frac{x}{5} + 7 = 15$$

$$\underline{-7 \quad -7}$$

The two sides of an equation are equal.

For the two sides to stay equal, whatever we do to one side of the equation has to be done to the other.

REVIEW THE VARIABLES CHAPTER OF BEAST ACADEMY 3C FOR AN INTRODUCTION TO SOLVING EQUATIONS.

Since  $\frac{x}{5} + 7 - 7 = \frac{x}{5}$ , and  $15 - 7 = 8$ ...  
...subtracting 7 from both sides of the equation gives us  $\frac{x}{5} = 8$ .

Pop!

$$\frac{x}{5} + 7 = 15$$

$$\underline{-7 \quad -7}$$

$$\frac{x}{5} = 8$$

Adding 7 and subtracting 7 are called **inverse operations**.

Addition and subtraction are opposites...

...they undo each other.

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$$\frac{x}{5} + 7 = 15$$

$$\underline{-7 \quad -7}$$

$$\frac{x}{5} = 8$$

How could you finish solving the equation?