We spend a lot of time undoing things.

What do you mean?

We unplug clogs...

...unlock locks...

...unpack packages...

...unspill spills...

...untangle tangles...

...ungrow growth...

...un--

Okay, I see your point.

Math beasts spend a lot of time undoing things, too.

How so?
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?

Try it.

Math operations are the things we do to numbers, like addition, subtraction, multiplication and division.

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?

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.
2. Add 7 to the result to get 15.

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

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

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

Perfect! You figured out my number.

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?

*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. \[ \frac{x}{5} \]
2. Add 7 to the result to get 15. \[ \frac{x}{5} + 7 \]
What is my number?

Then, we add 7 to the result. That gives us \( \frac{x}{5} + 7 \).

Dividing your number by 5 and adding 7, we get 15. So, \( \frac{x}{5} + 7 = 15 \).

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.

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

\[ \frac{x}{5} + 7 = 15 \]

Huh?

How could you solve this equation for \( x \)?
Review the variables chapter of Beast Academy 3C for an introduction to solving equations.

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

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

$$-7 \quad -7$$

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

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

Both sides?

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.

Subtracting 7 from both sides gives us $$\frac{x}{5} = 8$$.

Since $$\frac{3}{5} + 7 = \frac{3}{5}$$, and $$15 - 7 = 8$$...

...subtracting 7 from both sides of the equation gives us $$\frac{x}{5} = 8$$.

Addition and subtraction are opposites...

...they undo each other.

How could you finish solving the equation?