1.1 Ready, Set, Go!

Ready

Topic: Recognizing a solution to an equation.

The solution to an equation is the value of the variable that makes the equation true. You can check to see if the value is a solution but substituting (plugging in the number).

For example: Which value is a solution to the equation? $3x + 7 = 1$; $x = 2$ or $x = -2$

To answer this question, start by substituting 2 into the equation for x: $3(2) + 7 = 1$.
Next, simplify the left-hand side to see if it matches the right-hand side: $6 + 7 = 1$
The symbol $\neq$ means "not equal to". So x = 2 is not a solution: $13 \neq 1$
Next, let's do the same process to see if x = -2 is a solution: $3(-2) + 7 = 1$
$-6 + 7 = 1$
When we substitute -2 into the equation, the 2 sides are equal. $1 = 1$ ✓

x = -2 is a solution to the equation $3x + 7 = 1$

For equations with 2 variables like $y = 3x + 7$, there are many solutions (infinitely many, in fact). So how do we find these solutions? Well, for a linear equation, the solutions will be all the points on the line formed when we graph the equation. In the first example, the solution only involved 1 variable (x = -2). For an equation with 2 variables, we will write the solution as an ordered pair, (x, y). The x value is always listed first. If we are given a value for x, we can substitute this number into the equation and solve for y. Our result will be listed as an ordered pair.

For example: In the equation, $y = 3x + 7$ if we are given (2,) what y value will make the equation true?

Based on the ordered pair, (2,) we can see that x = 2. Substitute this into the equation: $y = 3(2) + 7$
We need to simplify the right-hand side of the equation so see what y is equal to: $y = 6 + 7$
We see that when we plug in 2, we get that y = 13. $y = 13$
The solutions to this equation must be points on the line, so we write our solution as an ordered pair: (2, 13)

Video help: https://youtu.be/FxwIMt9geoc

Set

Topic: Using a constant rate of change to complete a table of values.

In mathematics it is often useful to look for a pattern to simplify our thinking. One common type of pattern occurs when we encounter a constant rate of change. A constant rate of change means that we add (or subtract) the same amount each time. For example, in the pattern 2, 4, 6, 8, 10, … we start with 2 and add 2 each time. Identifying a pattern can help us to predict what will happen next. In the pattern 2, 4, 6, 8, 10 we can predict that the next number will be 12. This same type of pattern often occurs in word problems.

For example: You are saving for a Nintendo Switch. You already have $50 and you are going to mow lawns for $15/lawn. This problem can be represented with a pattern the same way as the previous example. For this situation we start with $50 and add $15 for every lawn we mow. We can use a table to organize our information:

# of lawns	1	2	3	4	5	6	7
Amount of $ saved	$65	$80	$95	$110	$125	$140	$155

This first box represents the original $50 plus $15 for one lawn

We keep adding $15 to the previous amount because we make $15 for each additional lawn we mow.

Explanation: We start with $50 and add $15 for each lawn that we mow.

Another example: Your parents loan you $300 to buy the Nintendo Switch so you don't have to wait. You will use your lawn mowing business to pay them back at a rate of $10 per week. This time the amount of money we owe is decreasing so we will be subtracting $10 each week. Here is the pattern represented in a table:

# of weeks	1	2	3	4	5	6	7
Amount of $ owed	$290	$280	$270	$260	$250	$240	$230

This first box represents the original $300 minus $10 for one week of payments

We keep subtracting $10 from the previous amount because we pay $10 each week (our debt is decreasing by $10 each week)