Consecutive integers

Consecutive integers are integers that are one unit apart from each other. Integers are “whole numbers” that are either positive, negative, or 0, which means we’re not including fractions or decimals.

Working with negative numbers can seem difficult at first. Remember that in ascending order, the negative numbers come first. Here are some consecutive integers written in ascending order (smallest to largest):

$$-5,\ -4,\ -3,\ -2,\ -1,\ 0,\ 1,\ 2,\ 3,\ 4,\ 5$$

Example

Write the three consecutive integers that immediately follow -2.

Since consecutive integers are one unit apart from each other, if we write the three consecutive integers that immediately follow -2, we get

$$-1,\ 0,\ 1$$

Let’s try another example of consecutive integers.

Example

Write the three consecutive integers that immediately precede -1.

Since consecutive integers are one unit apart from each other, if we write the three consecutive integers that immediately precede -1, we get

$$-4, \ -3, \ -2$$

Consecutive integers often crop up in word problems.

Example

Find three consecutive integers whose sum is 39.

First, we'll define a variable, n, as the smallest of our three consecutive integers. We often use variable names such as n and m, rather than x and y, for integers. When we need to define more than two variables for integers, we usually use letters of the alphabet that are in the range i through n.

Since consecutive integers are one unit apart from each other, our other two consecutive integers are $n+1$ and $n+1+1$, or $n+2$. Since the sum of our three consecutive integers is 39, we have

$$n+(n+1)+(n+2)=39$$

Removing the parentheses, and then grouping and combining like terms, we get

$$n+n+1+n+2=39$$

$$(n + n + n) + (1 + 2) = 39$$

$$3n + 3 = 39$$

To solve this equation, we'll first subtract 3 from both sides.

$$3n + 3 - 3 = 39 - 3$$

$$3n = 36$$

Now we'll divide both sides by 3.

$$\frac{3n}{3} = \frac{36}{3}$$

$$n = 12$$

Don't forget that we have to look back at the question that was asked, and give the answer to it. We were asked to find three consecutive integers whose sum is 39. What we found is that the smallest of our three consecutive integers (which is n) is 12. So our other two consecutive integers are $n + 1$, or $12 + 1$, or 13 and $n + 2$, or $12 + 2$, or 14.

We can then double check our work by plugging these values into the equation we found originally.

$$n + (n + 1) + (n + 2)$$

$$12 + 13 + 14$$

$$25 + 14$$

$$39$$

Let's look at another typical word problem - in this case, one that involves consecutive even integers.

Example

Find three consecutive even integers whose sum is 54.

First, we'll define a variable, n, as the smallest of our three consecutive even integers. Now note that any two consecutive even integers (like 2 and 4) are two units apart from each other, so our other two consecutive even integers are $n + 2$ and $n + 2 + 2$, or $n = 4$. Since the sum of our three consecutive even integers is 54, we have

$$n + (n + 2) + (n + 4) = 54$$

Removing the parentheses, and then grouping and combining like terms, we get

$$n + n + 2 + n + 4 = 54$$

$$(n + n + n) + (2 + 4) = 54$$

$$3n + 6 = 54$$

To solve this equation, we'll first subtract 6 from both sides.

$$3n + 6 - 6 = 54 - 6$$

$$3n = 48$$

Now we'll divide both sides by 3.

$$\frac{3n}{3} = \frac{48}{3}$$

$$n = 16$$

Again, we have to look back at the question that was asked, and give the answer to it. We were asked to find three consecutive even integers whose sum is 54. What we found is that the smallest of our three consecutive even integers (which is n) is 16. So our other two consecutive integers are $n + 2$, or $16 + 2$, or 18 and $n + 4$, or $16 + 4$, or 20.

We can then double check our work by plugging these values into the equation we found originally.

$$n + (n + 2) + (n + 4)$$

$$16 + 18 + 20$$

$$34 + 20$$

$$54$$

Note that any two consecutive odd integers (like 3 and 5) are also two units apart from each other, so we would use a similar approach when solving word problems involving consecutive odd integers.