Consecutive Integer Problems

The word consecutive means following one another in a regular order without a break.

Consecutive Integers:

Consecutive integers are numbers which differ by 1.

Example: 1, 2, 3, 4 are consecutive integers.

1 + 0 = 1, 1 + 1 = 2, 1 + 2 =3, 1 + 3 = 4 and so on.

Did you notice a pattern here?

Lets try another.

Example: 6, 7, 8, 9 are consecutive integers

6 + 0 = 6
6 + 1 = 7
6 + 2 = 8
6 + 3 = 9

Do you see that pattern?

We add the sequence 0, 1, 2, 3 .... to the first integer.

Lets try another.

Example: 23, 24, 25, 26 are consecutive integers.

23 + 0 = 23
23 + 1 = 24
23 + 2 = 25
23 + 3 = 26

What do you think would happen if we only knew the first of 4 consecutive integers?

Let $\boldsymbol{x}$ = first integer

$x + 0$ = fist integer
$x + 1$ = second integer
$x + 2$ = third integer
$x + 3$ = fourth integer

Lets try it for 23, 24, 25, 26

Let $\boldsymbol{x}$ = first integer= 23

$x + 0$ = first integer= 23
$x + 1$ = second integer= 24
$x + 2$ = third integer= 25
$x + 3$ = fourth integer= 26

Consecutive Even Integers:

Consecutive even integers are numbers which differ by 2.

Example: 2, 4, 6, 8 are consecutive *even* integers.

What do you think this pattern will look like?
Lets try another.

Example: 6, 8, 10, 12 are consecutive even integers

6 + 0 = 6
6 + 2 = 8
6 + 4 = 10
6 + 6 = 12

Do you see that pattern?
We add the sequence 0, 2, 4, 6 .... to the first even integer.
Lets try another.

Example: 24, 26, 28, 30 are consecutive even integers.

24 + 0 = 24
24 + 2 = 26
24 + 4 = 28
24 + 6 = 30

What do you think would happen if we only knew the first of 4 consecutive integers?

Let $\boldsymbol{x}$ = first even integer

$x + 0$ = first even integer
$x + 2$ = second even integer
$x + 4$ = third even integer
$x + 6$ = fourth even integer

Lets try it for 32, 34, 36, 38

Let $\boldsymbol{x}$ = first integer = 32

$x + 0$ = first integer = 32
$x + 1$ = second integer = 34
$x + 2$ = third integer = 36
$x + 3$ = fourth integer = 38

Consecutive Odd Integers:

Consecutive even integers are numbers which differ by 2.

Example: 3, 5, 7, 9 are consecutive *odd* integers.

What do you think this pattern will look like?
Lets try one.

Example: 11, 13, 15, 17 are consecutive odd integers

11 + 0 = 11
11 + 2 = 13
11 + 4 = 15
11 + 6 = 17

Do you see that pattern?
We add the sequence 0, 2, 4, 6 .... to the first odd integer.
Does this look familiar?
Lets try another.

Example: 23, 25, 27, 29 are consecutive even integers.

23 + 0 = 23
23 + 2 = 25
23 + 4 = 27
23 + 6 = 29

What do you think would happen if we only knew the first of 4 consecutive integers?

Let $\boldsymbol{x}$ = first even integer

$x + 0$ = first odd integer
$x + 2$ = second odd integer
$x + 4$ = third odd integer
$x + 6$ = fourth odd integer

Lets try it for 33, 35, 37, 39

Let $\boldsymbol{x}$ = first integer = 33

$x + 0$ = first integer = 33
$x + 1$ = second integer = 35
$x + 2$ = third integer = 37
$x + 3$ = fourth integer = 39

Did you notice that the even and odd integers are set up exactly the same?

Lets do some Algebra word problems!

Find three consecutive integers whose sum is 87.

Start by setting up the formula for consecutive integers:

Let $\boldsymbol{x}$ = first integer

$x + 0$ = first integer
$x + 1$ = second integer
$x + 2$ = third integer

We do know that these numbers add to 87, so lets do that:

$$x + 0 + x + 1 + x + 2 = 87$$

Do the Algebra:

$$\begin{array}{rcl} 3x + 3 & = & 87 \\ \underline{-3} & & \underline{-3} \\ \frac{3x}{3} & = & \frac{84}{3} \\ x & = & 28 \end{array}$$

Now replace back into the formula:

Let $\boldsymbol{x}$ = 28

$x + 0 = 28$
$x + 1 = 29$
$x + 2 = 30$

The consecutive integers that add to 87 are 28, 29 and 30.

Check:
28, 29 and 30 are consecutive integers.
$28 + 29 + 30 = 87$

In a Nutshell:

	Consecutive Integers	Consecutive Odd Integers	Consecutive Even integers
Examples:	1, 2, 3, 4... ...-4, -3, -2, -1, 0	1, 3, 5, 7... ...-7, -5, -3, -1	2, 4, 6, 8... ... -8, -6, -4, -2
Types of integers	Even and Odd	Odd only	Even only
Difference	1	2	2
first consecutive integer second consecutive integer third consecutive integer	x $x + 1$ $x + 2$	x $x + 2$ $x + 4$	x $x + 2$ $x + 4$

Every problem works the same way. Now try your homework.