

01

The equation $\square + \square + \square + \bigcirc = \bigcirc + \bigcirc$ is not true with 2 in \square and 3 in \bigcirc . Find as many pairs of numbers as possible that can be put in the \square and in the \bigcirc to make the equation true. For example, 0 in both \square and \bigcirc makes it true. Arrange your answers in a table like this.

\square	\bigcirc
0	0
...	...
:	:
n	n

Describe any pattern you notice. Explain why the pattern holds.

\square	\bigcirc
0	0
1	3
2	6
3	9
;	;
n	3n

If $\square = x$ and $\bigcirc = y$

then the equation becomes

$$x + x + x + y = y + y$$

$$\Rightarrow 3x = y$$

This pattern holds good for this equation

02 The sum of 11 consecutive numbers is 187. Find the sum of the next 15 consecutive numbers.

Let the 1st number be x ,
then the next 10 numbers will be
 $x + 1, x + 2, \dots, x + 10$
 $x + x + 1 + x + 2 + \dots + x + 10 = 187$
 $\Rightarrow 11x = 132$
or $x = 12$
 $m + 10 = 22 \Rightarrow$ next 15 numbers will start from 23
 $\therefore 23 + 24 + \dots + 37 = 450$

03 If an operation is defined as
 $a * b = 3a - b$, the value of x in $x * (1 * 2) = 2$ is

$$1 * 2 = 3 \times 1 - 2 = 1$$

$$x * 1 = 2$$

$$3x - 1 = 2$$

$$3x = 3$$

$$\Rightarrow x = 1$$

04

We can select any 2 numbers, where the sum (or) subtraction becomes "-4".

Write a two-step equation for which - 4 is the solution

(Answer may vary)

05

Find the value of 'a' in $\frac{a}{1 \times 2} + \frac{a}{2 \times 3} + \frac{a}{3 \times 4} + \dots + \frac{a}{2021 \times 2022} = 1$

$$a \left(\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{2021 \times 2022} \right) = 1$$

$$\Rightarrow a \left(1 - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \dots + \frac{1}{2021} - \frac{1}{2022} \right) = 1$$

$$\Rightarrow a \left(1 - \frac{1}{2022} \right) = 1$$

$$\Rightarrow a \left(\frac{2021}{2022} \right) = 1$$

$$\Rightarrow a = \frac{2022}{2021}$$