CHAPTER – 16
PLAYING WITH NUMBERS

EXERCISE – 16.2

Question – 1

If 21y5 is a multiple of 9, where y is a digit, what is the value of y?

Answer:

We know that. if a number is a multiple of 9, then the sum of its digits will be divisible by 9

Sum of digits of $21y5 = 2 + 1 + y + 5 = 8 + y$

Hence, $8 + y$ should be a multiple of 9

This is possible when $8 + y$ is any one of these numbers 0, 9, 18, 27, and so on …

However, since y is a single digit number, this sum can be 9 only.

$8 + y = 9$
$y = 9 - 8y = 1$

Therefore, y should be 1 only

Question – 2

If 31z5 is a multiple of 9, where z is a digit, what is the value of z?
You will find that there are two answers for the last problem. Why is this so?

Answer:

We know that if a number is a multiple of 9, then the sum of its digits will be divisible by 9

Sum of digits of $31z5 = 3 + 1 + z + 5 = 9 + z$

Hence, $9 + z$ should be a multiple of 9

This is possible when $9 + z$ is any one of these numbers 0, 9, 18, 27, and so on …

But, since z is a single digit number, this sum can be either 9 or 18

Therefore, z should be either 0 or 9

Question – 3

If 24x is a multiple of 3, where x is a digit, what is the value of x?
(Since 24x is a multiple of 3, its sum of digits 6 + x is a multiple of 3; so 6 + x is one of these numbers: 0, 3, 6, 9, 12, 15, 18, ... But since x is a digit, it can only be that 6 + x = 6 or 9 or 12 or 15. Therefore, x = 0 or 3 or 6 or 9. Thus, x can have any of four different values)

Answer:

Since $24x$ is a multiple of 3, the sum of its digits is a multiple of 3

Sum of digits of $24x = 2 + 4 + x = 6 + x$

Hence, $6 + x$ is a multiple of 3

This is possible when $6 + x$ is any one of these numbers 0, 3, 6, 9, and so on …

Since x is a single digit number, the sum of the digits can be 6 or 9 or 12 or 15 and the value of x comes to 0 or 3 or 6 or 9 respectively

Thus, x can have its value as any of the four different values 0, 3, 6, or 9

Question – 4

If 31z5 is a multiple of 3, where z is a digit, what might be the values of z?

Answer:

Since 31z5 is a multiple of 3, the sum of its digits will be a multiple of 3

That is, $3 + 1 + z + 5 = 9 + z$ is a multiple of 3

This is possible when $9 + z$ is any one of 0, 3, 6, 9, 12, 15, 18, and so on …

Since z is a single digit number, the value of $9 + z$ can only be 9 or 12 or 15 or 18 and thus, the value of x comes to 0 or 3 or 6 or 9 respectively

Thus, z can have its value as any one of the four different values 0, 3, 6, or 9