ASSIGNMENT – 2(MATHEMATICS) CLASS – 8

Copy the notes in your maths copy and then do the homework in the same copy.

CHAPTER - 5

PLAYING WITH NUMBERS

- Reversing the digits of a 3-digit number
  Let us consider a 3-digit number 367
  Reverse the digit, we get a new number i.e. 763
  Subtracting the smaller number from the larger number, we get
  763 – 367 = 396
  Thus, 396 = 99 x 4, the number is divisible by 99 and also divisible by 10 the difference of unit digit and hundred's digit i.e. 7 – 3 = 10
  Check:-
  Consider any 3-digit number abc i.e. 100a + 10b + c
  Reverse the digit abc to get a new number cba i.e. 100c + 10b + a
  Now if you subtract, three cases arise:
  Case 1 – if a>c, then the difference will be
  (100a + 10b + c) - (100c + 10b + a) = 100a - a + 10b - 10b + c - 100c
  = 99a – 99c
  = 99 (a – c)
  Case 2 – if c>a, then the difference will be
  (100c + 10b + a) - (100a + 10b + c) = 100c - c + 10b - 10 b + a - 100a
  = 99c – 99a
  = 99 (c – a)
  Case 3 – if c = a, then difference is zero

- Consider another 3-digit number 678
  Now change the order of digits cyclically, we get 786, 867
  Add these numbers, we get

$$678 + 786 + 867 = 2331$$
$$= 111 \times 21$$
$$= 3 \times 37 \times 21$$

  So, the sum is divisible by 111, 21 (sum of digits, i.e. 6+7+8), 37 and 3.

  Check:-

  Consider any 3-digit number abc i.e. 100a + 10b + c
  Change the order of digits cyclically to get new numbers
  i.e. bca = 100b + 10c + a
  cab = 100c + 10a + b
  On adding numbers, we get

$$abc + bca + cab = (100a+10b+c) + (100b+10c+a) + (100c+10a+b)$$
$$= 111a + 111b + 111c$$
$$= 111 (a + b + c)$$
$$= 3 \times 37 \times (a + b + c),$$

  the sum is always divisible by 111, (a + b + c), 37 and 3

Exercise 5.1

Q. no. 4 – Without actual calculation, write the quotient when the sum of a 3-digit number abc and the number obtained by changing the order of digits cyclically i.e. bca and cab is divided by
(i) 111 (ii) (a + b + c) (iii) 37 (iv) 3
Solution: Let the number be abc i.e. 100a + 10b + c
Now change the order of digits cyclically to get new numbers
i.e. bca = 100b + 10c + a
cab = 100c + 10a + b

On adding these numbers, we get

abc + bca + cab = (100a+10b+c) + (100b+10c+a) + (100c+10a+b)

= 111a + 111b + 111c

= 111 (a + b + c)

= 3 x 37 (a + b + c)

(i) when sum is divided by 111, quotient is (a + b + c)

(ii) When sum is divided by (a + b + c), quotient is 111

Q. no. 7 – If the difference of two digit number and the number obtained by reversing the digits is 36, find the difference between the digits of the 2-digit number.

Solution – Let the number be ab i.e. 10a + b

On reversing the digits, we will get a new number ba i.e. 10b + a

Difference = 36

(10a + b) – (10b + a) = 36

9a – 9b = 36

9 (a – b) = 36

a – b = 4

Q. no. 9 – The middle digit of a 3-digit number is 0 and the sum of the other two digits is 11. If the number obtained by reversing the digits exceeds the original number by 495. Find the number.

Solution – let the 3-digit number be abc i.e. 100a + 10b + c

The middle digit of a 3-digit no. is 0 i.e. b = 0

And a + c = 11 (given) ---------- (i)

Reverse the number to get a new number, cba =100c+10b+a

According to question,

$100c + 10b + a = 100a + 10b + c + 495$

$100c + 10b + a – 100a – 10b – c = 495$

$99c – 99a = 495$

$99 (c – a) = 495$

$c – a = 5$ ---------- (ii)

Solving equation (i) and (ii) by elimination method, we will get

$c = 8$ and $a = 3$

So, the number = $100a + 10b + c = 100 \times 3 + 10 \times 0 + 8$ ($b = 0$ given)

$= 300 + 0 + 8$

$= 308$

Q. no. 10 – In a 3-digit number, unit's digit, ten's digit and hundred's digit are in the ratio 1:2:3. If the difference of original number and the number obtained by reversing the digits is 594, find the number.

Solution – Let the 3-digit number be abc i.e. $100a + 10b + c$

Unit's digit = c, ten's digit = b and hundred's digit = a

$c : b : a = 1 : 2 : 3$ (given)

$c = x$, $b = 2x$, $a = 3x$

On reversing the digit, we will get a new number i.e. cba = $100c + 10b + a$

According to question,

Difference = 594

$100a + 10b + c – (100c + 10b + a) = 594$

$99a – 99c = 594$

$99 (a – c) = 594$

$a – c = 6$

$3x – x = 6$

$2x = 6$

$x = 3$

Put the value of x to get the value of a, b and c

$a = 3x = 3 \text{ X } 3 = 9$

$b = 2x = 2 \text{ X } 3 = 6$

$c = x = 3$

so, the number = $100a + 10b + c$

$= 100 \text{ x } 9 + 10 \text{ x } 6 + 3$

$= 900 + 60 + 3$

$= 963$

Home-work:

Exercise 5.1 question no. 4 (iii and iv), 5, 11 and Example-6

[HINT for q.no. 11 – Let the no. be abc, $c = a + 1$, $b = a – 1$

$100a + 10b + c + 100b + 10c + a + 100c + 10a + b = 2664$]