BISHOP SCOTT BOYS' SCHOOL

(Affiliated to CBSE, New Delhi) Affiliation No.: 330726, School Campus: Chainpur, Jaganpura,
By-Pass, Patna 804453.
Phone Number: 7061717782, 9798903550. ,
Web: www.bishopscottboysschool.com Email: info@bishopscottboysschool.com

ONLINE TEACHING MATERIAL
MATHEMATICS
SESSION-2020-21
CLASS-VIII

TOPIC: Playing with Numbers

❖ **NCERT BOOK**

Click on the link given below:

http://ncert.nic.in/textbook/textbook.htm?hemh1=16-16

❖ **Notes**

Generalized Form: A number is said to be in a generalized form if it is expressed as the sum of the product of its digits with their respective place values.

Thus, a two digit number having a and b as its digits at the tens and the ones places respectively is written in the generalized form as 10 a +b , i.e. , in general , a two digit number can be written as 10 a + b , where a can be any of the digits from 1 to 9 and b can be any of the digits from 0 to 9 .

Similarly, a three digit number can be written in the generalized form as 100 a + 10 b + c, where a can be any one of the digits from 1 to 9 while b and c can be any of the digits from 0 to 9.

Eg   56 = 10 x 5 + 6
         129 = 100 x 1 + 2 x 10 + 9

Test of divisibility for numbers expressed in the generalized form
1. **Test of divisibility by 2 –** A number is divisible by 2 , if its units digit is even , i. e. , if its units digit is any of the digits 0,2 ,4 , 6 or 8.

   For a number in the generalized form:

   A general two digit number 10 a + b is divisible by 2 if b is any of the digits 0,2,4,6 or 3.

   A general three digit number 100 a + 10 b +c is divisible by 2 if c is any of the digits 0,2,4,6 or 8

   2. **Test of divisibility by 3 –** A number is divisible by 3, if the sum of its digits is divisible by 3.
   3. **Test of divisibility by 5 –** A number is divisible by 5 , if its units digit is either 0 or 5.
   4. **Test of divisibility by 9 –** A number is divisible by 9 , if the sum of its digits is divisible by 9
   5. **Test of divisibility by 10 -** A number is divisible by 10 , if its unit's digit is 0

Reversing the 2 digit numbers and adding them

When a two digit number is reversed and added with the number, the resulting number is perfectly divisible by 11 and the quotient is equal to the sum of the digits

For eg: The reverse of 29 is 92.

The sum of 29 and 92 = 29 +92 = 121.

On dividing the sum by 11, we get 121/11 = 11 = 9+2.

So, the sum is divisible by 11 and the quotient is equal to the sum of the digits of the number.

Reversing the 2 digit numbers and Subtracting them

When a two digit number is reversed and the larger number is subtracted from the smaller number, the resulting number is perfectly divisible by 9 and the quotient is equal to the difference of the digits of the number.

For example, the reverse of the number 39 is 93.

Now, 93 > 39.

So, 93 – 39 = 54

On dividing the difference of the two number by 9, we get, 54/9 = 6 = 9−3

So, the difference is divisible by 9 and the quotient is equal to the difference of the digits.

Reversing the 3 digit numbers and subtracting them

When a three digit number is reversed and the smaller number is subtracted from the larger number, the resulting number is perfectly divisible by 99 and the quotient is equal to the difference between the first and third digit of the selected number.

For example, the reverse of 123 is 321.

Now, 321 > 123.

321 – 123 = 198

Now,198/99 = 2 = 3 – 1

So, the difference between 123 and 321 is divisible by 99 and the quotient is equal to the difference between 3 and 1.

1. Find the reminder when 981547is divided by 5. Do this without doing actual division.

   Ans: 2

2. Find the remainder when 51439786 is divided by 3. Do this without doing actual division.

   Ans: 1

3. Find the remainder, without performing actual division, when 798 is divided by 11.

   Ans:6

4. Solve the following to get the values of A & B:

   i.   3   1   A
      +   1   A   3
          5   0   1

   ii.   B   9
      +   4   A
          6   5

   Ans. A=8; A=6, B= 1

5. Write the following numbers in the form 10b +a.
   i) 231   ii)   542   iii)   908   Ans. a=1,b=23; a=2, b=54; a= 8, b=90

6. Solve the following to get the values of A & B:

   i.   1   A
            x   A
            9   A
   ii.   A   B
            x   6
            B B B
   iii.   A   B
            x   5
            C A B   Ans. A=6; A=7,B=4; A=7,B=5, C=3

7. Write the quotients when the difference of 985 and the number obtained by interchanging its ones and hundreds digit is divided by

   i) 99   ii)   4   iii)   33   iv)   3   Ans. 4; 99; 12; 132

8. Write all prime numbers between 1 and 50.

9. If $\overline{31z}$ is a multiple of 11, where z is digit, what is the value of z?

   Ans. 9

❖ **NCERT EXEMPAR LINK**

http://ncert.nic.in/ncerts/l/heep213.pdf

==Click on the links given below to watch the Videos:==

- ❖ **Link-1**

  https://youtu.be/Df9h5t64NlQ

- ❖ **Link-2**
Recognizing divisibility

https://youtu.be/2G_Jr_XpnY4

- ❖ **Link-3**
The why of the 3 divisibility rule

https://youtu.be/NehkLV77ITk

- ❖ **Link-4**
The why of the 9 divisibility rule

https://youtu.be/XAzFGx3Ruig

- ❖ **Link-5**

==**DIKSHA APP LINKS:**==

Learning Outcome - Numbers

https://diksha.gov.in/play/collection/do_31279645526767206411 7183?contentType=TextBook&contentId= do_31279388280390451219948

Playing With Numbers (numbers)

https://diksha.gov.in/play/collection/do_31279645526767206411 7183?contentType=TextBook&contentId= do_31279570356636057611 1619

Long Answer - Numbers

Multiple Choice Question - Numbers

Short Answer - Numbers

SOME SOLVED QUESTIONS TO PRACTICE

Question 1: Express 3458 in a generalised form.

Ans: 3458 will be written in a generalized way in the following manner,

$3458 = 3 \times 10^3 + 4 \times 10^2 + 5 \times 10^1 + 8 \times 10^0$

Question 2: Express the given number in a normal form: (2 x 1000) + (2 x 10)

Ans: (2 x 1000) + (2 x 10) will be written in a generalised form in the following way:

(2 x 1000) + (2 x 10) = 2000 + 20 = 2020

Question 3: If the following number is divided by 13, find the quotient and remainder.

Solution : dividend = pq + r

1220 = 13 × 93 + 11

Quotient = 93

Remainder = 11

Question 4: What is the least natural number which is larger than 100 and which leaves the remainder, R = 12 when it is divided by 19.

Ans: 100 = 19 × 5 + 5

As 5 + 7 = 12, and the required number is 100 + 7 = 107

Question 5: What is the smallest number you have to add to 100000 to get a multiple of 1234?

Ans: 100000 = 1234 × 81 + 46 = 1234 – 46 = 1188, so the required number is 1188.

Question 6: How many numbers from 1001 to 2000 are divisible by 4?

Ans: 1004, 1008, 1012, 1016… are the numbers between 1001 and 2000 which are divisible by 4.

Therefore, there will be (2000-1004) 4 + 1 = 250 numbers between 1001 and 2000, and these will be divisible by 4.

Question 7: Show that if a palindrome is 4 digits, it would be divisible by 11?

Ans: Let us assume abba is the four-digit palindrome.

So, abba = a x 1000 + cb x 100 + b x 10 + a

= 1001a +110b

= 91 x 11a + 110b

= 11 x (91a + 10b)

Hence Proved.

Question 8: Make a 5 digit number using each of the digits 4,5,6,7,8. Also see that the number made shall be divisible by 132.

Ans: 132 can be written as 11 x 12 = 3 x 4 x 11

As 4 + 5+ 6+ 7+ 8 = 30, the numbers formed by the 4,5,6,7,8 are all divisible by 3.

Let's check the disability by 11 and 4.

If the number is divisible by 4, if the last 2 digits of the number formed is divisible by 4.

Similarly, if the difference between the sum of digits placed at even and the sum of digits placed at odd places is divisible by 11, then the number is divisible by 11.

Question 9. By which number 345111 is divisible amongst the given options – 15, 12, 3, 9.

Ans: Add all the digits in the number given – 345111

345111 + 3+4+5+1+1+1 = 15, which is divisible by 3. So, 3 is the correct option.

Question 10: Can you tell a 5 digit number which will be divisible by 11 and it should have digits 2,3,4,5,6?

Ans:

So now, 2 – 4 + 3 – 6 + 5 = 0, so 24365 is the least 5 digit number which is also divisible by 11.

Consider the number 24365 formed by the digits 2, 3, 4, 5 and 6

Here, 2 − 4 + 3 − 6 + 5 = 0

Thus, 24365 is the smallest number divisible by 11.