

Name :				
Grade :	VIII			
Subject :	Mathematics			
	Chapter: 1	6. Playing with r	<u>number s</u>	
Obj ect ive	Type Questions			1 Marks
<u> </u>				
	І. М	ultiple choice questio	ns	
1 Generalised f	ormafour-digit number	abde is	INCERT	Exemplar]
	+ $100 b$ + $10 c$ + d		100 c + 10 b + d	Exemplai
	+ 100 b + 10 c + a + 100 b + 10 d + c	d. $a \times b \times c$		
	orm of a two - digit num			Exemplar]
a. $x + y$	b. $10x + y$	c. $10x - y$	d. $10y + x$	
	m of 1000a + 10b + c is:			Exemplar]
a. abc	b. abco	c. aobc	d. aboc	
	hree-digit number. The			Exemplar]
a. 9	b. 11	c. 18	d. 33	
5. The sum of all	the number formed by	the digits x, y and z o	of the number xyz is di	ivisible by
				Exemplar]
a. 11	b. 33	c. 37	d. 74	-
6. A four digit nu	umber aabb is divisible b	by 55. Then possible v	alue of b is / are.	
			[NCERT	Exemplar]
a. 0 and 2	b. 2 and 5	c. 0 and 5	d. 7	
7. Let abc be a t	hree digit number. T <mark>he</mark> r	n abc + bca + cab is not	t divisible by [NCERT	Exemplar]
a. a + b + c	c b.3	c. 37	d. 9	
8. A four-digit n	umber 4 ab 5 is divisible	e by 55. Then the value	e of b - a is: [NCERT	Exemplar]
a. 0	b. 1	c. 4	d. 5	0
9. If abc is a thr	ee digit number, then t	he number abc -a -b -c	c is divisble by	
			[NCER	T Exemplar]
a. 9	b. 90	c. 10	d. 11	

1



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10. A six-digit number is for med by repeating a three digit number. For example 256256,								
67867	′8, et c. Any	number of	t his f or m	is divisible	by.		[NCERT E	xemplar]
a. 7	7 only	b. 1	1 only	c. 13	only	d. 100)1	
11. If the	sum of digi	its of a num	nber is divis	sible by thr	ee, then th	ne number is	s always div	isible by
							[NCERT E	xemplar]
a.	2	b. 3		c. 6		d. 9		
12. If $x + y + z = 6$ and z is an odd digit, then the three-digit number xyz is [NCERT Exemplar]								
a. an odd multiple of 3			b. oc	ld mult i <mark>p</mark> le	of 6			
C. 6	even mult ip	le of 3		d. ev	en mult iple	e of 9		
13. I f 5 A	+ B 3 = 65	, then the v	value of A a	nd Bis			INCERT E	xemplar]
a. /	A = 2, B = 3	b. A	a = 3, B = 2	c. A	= 2, B = 1	d. A =	= 1, B = 2	
14.IfA3	+8 B = 150), then the	value of A	+ B is:			[NCERT E	xemplar]
a. 1	13	b. 1	2	c. 17		d. 15		
15. If 5 A	x A = 399,	then the v	alue of A is	3			INCERT E	xemplar]
a. 3	3	b. 6		c. 7		d. 9		
16.If 6 A	x B = A 8 I	B, then the	value of A	- Bis			INCERT E	xemplar]
a	2	b. 2		c3		d. 3		
17. Which	of the foll	owing numb	oersisdivis	ible by 99				xemplar]
a. 9	913462	b. 1	14345	c. 13	5792	d. 35	72406	
1. c	2. b	3. c	4. c	5.c	6.c	7. d	8. b	9. a
10. d	11. b	12. a	13. c	14. a	15. c	16. a	17. b	
		L						L
			I. Multipl	e choice qu	uest ions			
1. General	ised form o	of a three-o	digit numbe	r xvx is			[NCERT E	xemplar1
	x + y + z		$00x + \frac{10y}{10y} + \frac{10y}{1$		$0z + \frac{10y}{10} $	x d. 100	0y + 10z + z	
a. ,		5.1						-

2. If 5A + 25 is equal to B2, then the value of A + B is

a. 15b. 10c. 8d. 73. The sum of all the numbers for med by the digit x, y and z of the number xyz is divisible by

a. 11 b. 33 c. 37 d. 75





4. If x + y + z = 6 and z is an odd digit, then the three-digit number xyz is

- a. an odd multiple of 3 b. odd multiple of 6
- c. even multiple of 3 d. even multiple of 9
- 5. Which of the following numbers is divisible by 99?
 - a. 9,13,462 b. 1,14,345 c. 1,35,792 d. 35,72,406
- 6. If the division N ÷ 2 leaves no remainder and N ÷ 5 leaves remainder 4, then the units digit of N is
- a. 4 or 9 b. 4 c. 9 d. number other than 4 7. The number 99,73,820 is divisible by
 - a. 4, 5 and 6
 b. 4, 5, and 10
 c. 3, 4 and 5
 d. 3, 4 and 9

 1. b
 2. a
 3. c
 4. a
 5. b
 6. b
 7. b
 - I. Fill in the blanks.
- 1. The sum of a two-digit number and the number obtained by reversing the divisible by

[NCERT Exemplar]

2. The difference of a two-digit number and the number obtained by reversing its digits is

[NCERT Exemplar] always divisible by 2 B 3.1f + A B then A = and B = .[NCERT Exemplar] 8 Α A B 4. If x B then A = and B = [NCERT Exemplar] 9 6 1 В 5. If x B then B = _____ [NCERT Exemplar] 9B 4 2.9 3. A = 6, B = 34. A = 2, B = 45. B = 7 1.11





[NCERT Exemplar]

[NCERT Exemplar]

[NCERT Exemplar]

4. A three digit number abc is divisble by 6 if c is an even number and a + b + c a multiple of 3.

1. A two-digit number ab is always divisible by 2 if b is an even number.

2. A three-digit number abc is divisible by 5 if c is an even number.

3. A four-digit number abcd is divisible by 4 if ab is divisible by 4.

[NCERT Exemplar] 5. Number of the form 3N + 2 will leave remainder 2 when divided by 3. [NCERT Exemplar] 1. True 2. False 3. False 4. True 5. True I. Very short answers type questions. 1. If the division N ÷ 5 leaves a remainder of 3, what might be the one's digit of N? [NCERT Exemplar] The one's digit, when divided by 5, must leave a remainder of 3. So, the one's digit must be either 3 or 8. 2. If the division N ÷ 5 leaves a remainder o 1 what might be the one's digit of N? [NCERT Exemplar] If remainder = 1, then the one's digit of 'N' must be either 1 or 6. 3. If the division N ÷ 5 leaves a remainder of 4, what might be one's digit of N? Suppose that the division N \div 5 leaves a remainder of 4 and the division N \div 2 leaves a remainder of 1. What must be the one's digit of N? [NCERT Exemplar] If remainder = 4, then the one's digit of 'N' must be either 4 or 9. For $N \div 5$, remainder = 4 : One's digit cna be 4 or 9. ...(i) Again, for $N \div 2$, remainder = 1 \therefore N must be an odd number. So, one's digit of N must be 1, 3, 5, 7 or 9. ...(ii) From (i) and (ii) the one's digit of N must be 9. 4. If the division $N \div 2$ leaves a remainder of 1, what might be the one's digit of N? [NCERT Exemplar] *N* is odd; so it s one's digit is odd. Therefore, the one's digit must be 1, 3, 5, 7 or 9. 4 **Created by Pinkz**



5. Suppose that the division $x \div 5$ leaves a remainder 4 and the division $x \div 2$ leaves a remainder 1. Find the ones digit of x.

Since, $x \div 5$ leaves a remainder 4, so ones digit of x can be 4 or 9. Also, since $x \div 2$ leaves a remainder 1, so one digit must be 9 only.

6. Check the divisibility of the following numbers by 9.

b. 616

a. 108

[NCERT Exemplar]

a. 108

 $\therefore 1 + 0 + 8 = 9$

and 9 is divisible by 9

: 108 is divisible by 9.

b. 616

We have, 6 + 1 + 6 = 13and 13 is not divisible by 9 \therefore 616 is also not divisible by 9.

II. Very short answers type questions.

1. If a two digit number ab is always divisible by 2 then what kind of number b is?

Sol. We know that if a number is divisible by 2 then its ones place digit should be even. Hence, b must be an even number.

2. What is the usual form of 1000a +10b + c?

[NCERT Exemplar]

Since hundred place is not given then 0 will come in hundreds place. Hence, the usual form will be a0bc.

3. What type of numbers are divisible by 33?

All the numbers which are divisible by 3 as well as 11 will be divisible by 33.

4. What is the number by which the sum of any two digit number and its reverse is always divisible?

The number will be 11. Any two digit number is in the form 10 x a + b. Its reverse is 10 x b + a. Sum = 10a + b + 10b + a = 11a + 11b = 11(a + b)





5. What do you mean by Cryptarithms?

Sol. Cryptarithms are puzzles, on various operations on numbers, in which letters take the place of digits and one has to find out which letter represents which digit. (Or) Cryptarithms is a maths puzzle in which the digits are replaced by letters of the alphabet or other symbols.

6. Insert `+-, x or +' in each box to make the statement true.

(i) (50 **□** 9) **□**3 = 150

(ii) (60 8) 17 = 4

∴ (50 × 9) ÷ 9 = 150

∴ (60 + 8) ÷ 17 = 4

Sol. (i) $(50 \times 9) \div 3 = 450 \div 3 = 150$

(ii) $(60 + 8) \div 17 = 68 \div 17 = 4$

I. Short answers type questions.

1. A three-digit number 42x is divisible by 9. Find the value of x. [NCERT Exemplar]
 Since, 42x is divisible by 9, the sum of its digits, i.e. 4 _ 2 + x must be divisible by 9.
 i.e., 6 + x is divisible by 9.

i.e., 6 + x = 9 or 18,

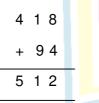
Since, x is a digit, therefore 6 + x = 9 or x = 3.

2. Find the value of A and B if + B 4 5 1 2

[NCERT Exemplar]

[NCERT Exemplar]

From ones column A + 4 gives a number whose ones digit is 2. So, A = b 8. The value of B can be obtained by solving 2 + B is a number whose ones digit is 1. So, B = 9.



3. Find the value of the letters of the following questions. 8 5

Sol. \therefore 5 + A = 13 or 23 or 33 etc.

∴ A = 13 - 5 = 8

or A = 23 - 5 18 is not possible



+4 A

BC 3



	∴ A = 8	Dad Reader Sad
	8	5
	+ 4	8
	13	3
	Thus	A = 8, B = 1, C = 3
4. I f	1 P where	P = 3, then find the values of
	X P Q 6	
	P and Q	[NCERT Exemplar]
Sol.	∴ and Q	$P \times P = 16 \text{ or } 36$
501.	 I f	$P \times P = 16 \Rightarrow P = 4$
	Then,	
	Hence,	Q = 5, P = 4 But $Q - P = 3$
	So,	P=4 is not possible
	Now take	$P \times P = 36 \Rightarrow P = 6$
		1 6
	Then,	x 6
		9 6
	Thus,	P = 6 and $Q = 9$
5. If	1 AB = CCA	= 697 and there is no carry-over in addition, find the value
of	A + B + C.	[NCERT Exemplar]
Sol.	1 AB + CCA =	= 697
	Hence,	B + A = 7
		A + C = 9
⇒	N	1+C=6 esc=6-1=5eneration School
<i>.</i>		A + C = 9
\Rightarrow		A + 5 = 9
⇒		A = 4





	B + A = 7
⇒	B + 4 = 7
⇒	B = 3

Now,

= 12

6. In a two digit number the units digit is four times the tens digit and the sum of the digits is 10. Find the number. [NCERT Exemplar]

х

- Sol. Let the tens digit =
 - Then the units digit = 4x
 - According to condition,

$$x + 4x = 10$$

5x = 10

 $x = \frac{10}{5} = 2$

or

or

- Thus tens digit = 2
- and units digit = $4x^2 = 8$

Hence, required number = 28

- 7. 756x is a multiple of 11, find the value of x.
 - Since, 756x is a multiple of 11. Sol. 7 + 6 = 5 + xThen, 13 = 5 + x⇒ x = 13 - 5 \Rightarrow x = 8⇒

[NCERT Exemplar]

[NCERT Exemplar]

8. Find all possible values of y for which the 4 digit number $51y^3$ is divisible by 9. Also,

find each such number.

Sol. Since, Number = $51y^3$

Then sum of digits =
$$(5 + 1 + y + 3)$$

$$= (9 + y)$$

Which must divisible by 9

When

ion School ... Required numbers are 5103 and 5193.

y = 0 or y = 9





[NCERT Exemplar]

II. Short answers type questions.

1. Without actual division find the remainder when 3,79,843 is divided by 3.

We can find the remainder by dividing the sum of all the digits of the given number

Sum of digits = 3 + 7 + 9 + 8 + 4 + 3 = 34

When 34 divided by 3, we get 1 as remainder.

Hence, division of 3,79,843 by 3 leaves remainder 1.

2. If 2A7 + A = 33, then find the value of A.

Sol
$$\frac{2A7}{A} = 33$$
 $\Rightarrow 2A7 = 33A$
 $\Rightarrow 2 \times 100 + A \times 10 + 7 \times 1 = 33A$
 $\Rightarrow 200 + 7 + 10A = 33A$
 $\Rightarrow 207 = 33A - 10A \Rightarrow 207 = 23A$
 $\Rightarrow A = \frac{207}{23} = 23$

Hence, the value of A = 9.

3. 1y3y6 is divisible by 11. Find the value of y.

As per the divisibility rule of 11,

Sum of even place number = y + y = 2y

and sum of odd place number = 1+3+6=10

Now difference = 10 - 2y

If the difference equalises 0, then

$$2y = 10 \Rightarrow y = 5$$

4. Fill in the blank squares of the magic square so that the sum of the numbers in each column, row and both the diagonals is 0.

Let the squares be filled as shown below. Sum of the numbers along one diagonal

is - 11 + 0 + c = 0 \Rightarrow c = 11 Sum of the numbers along 2nd column = 14 + 0 + b = 0⇒b = - 14 Sum of the numbers along first row = a + b + c = 0

 \Rightarrow a - 14 + 11 = 0 a = 3

Sum of the numbers along first column = a + d - 11 = 0

	0	-
-11	14	

а	b	С
d	0	е
-11	14	f



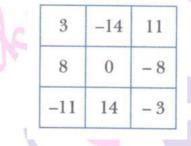
 \Rightarrow 3+d-11=0 \Rightarrow d = 8

Sum of the numbers along second row = d + 0 + e = 0

$$\Rightarrow 8 + 0 + e = 0 \qquad \Rightarrow \qquad e = -8$$

Sum of the numbers along third row = -11 + 14 + f = 0

- $\Rightarrow f = -3$
- :. We have



5. Solve:

C A + A B D D A

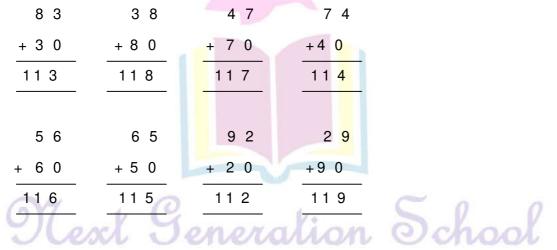
Sol. A + B = A is possible when B = 0, D must be 1 and B = 0,

		С	Α	
So, we have	+•	А	0	
	1	11	А	

Now sum of digits C and A is 11, without a carry digit.

So, these may be 8 + 3 or 3 + 8, or 4 + 7 or 7 + 4, or 6 + 5 or 5 + 6 or 2 + 9 or 9 + 2.

Thus, we may have many answers to these problems like



Note that generally a Cryptarithmetic has only one solution. So, we cannot put the above example in this category.





I. Long answer type questions.

- 1. A three digit number 2 a 3 is added to the number 326 to give a three digit number 5b 9 which is divisible by 9. Find the value of b - a. [NCERT Exemplar] Sol. 2 3 Given. а 2 6 3 5 b 9 Since, 5 b 9 divisible by 9. So, (5 + b + 9) is divisible by 9. So, clearly b = 4and a = 2 Thus, b - a = 4 - 2
- 2. If from a two-digit number, we subtract the number formed by reversing its digit then the result so obtained is a perfect cube. How many such numbers are possible? Write all of them. [NCERT Exemplar]
- Sol. Let two digit number be 10 a + b

Number after reversing the digit = 10b + a

According to condition, (10 a + b) - (10 b + a)

= 2

= 9a - 9b

= 9 (a - b) is a perfect cube

 So, if
 a = 9 then b = 6

 So
 Number = 96

 I f
 a = 8 then b = 5

 So,
 number = 85

a - b = 3

l f So,

Ιf

Then surely

number = 74

So, number = 63

If a = 5 then b = 2

So, number = 52

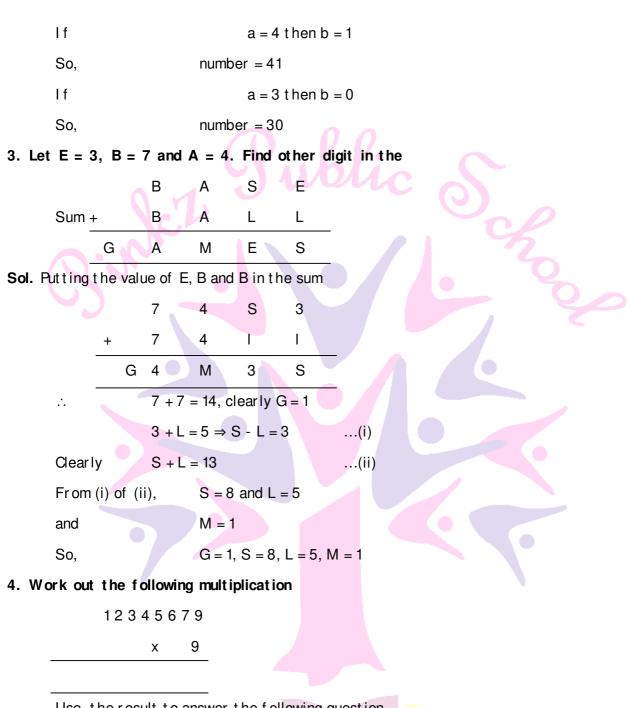
a = 7 then b = 4

a = 6 then b = 3



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Use the result to answer the following question.

a. What will be 12345679 x 45?

b. What will be 12345679 x 63?

- c. By what number should 12345679 be multiplied to get 8888888888?
- d. By what number should 12345679 be multiplied to get 999999999? [NCERT Exemplar]

Sol. 12345678 Schoo x 9

a. $12345678 \times 45 = (12345679 \times 9) \times 5$

= (111111111) x 5

12





= 555555555

b. $12345679 \times 63 = (12345679 \times 9) \times 7$

= (111111111) x 7

= 777777777

by

To get 8888888888, we should multiply

9 x 8 = 72

5. If 51x3 is a multiple of 9, where x is a digit, then what is the value of x?

[NCERT Exemplar]

Sol. We have, the sum of the digits of 51x = 5 + 1 + x + 3 = 9 + x

Since, 51x 3 is divisible by 9.

 \therefore (9 + x) must be divisible by 9.

 \therefore (9 + x) must be equal to 0 or 9 or 18 or 27 or ...

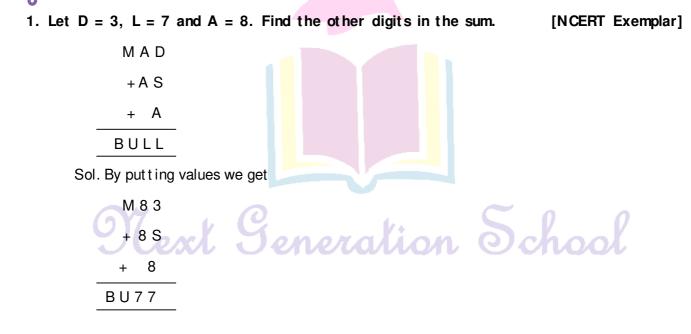
But x is a digit, then

 $9 + x = 9 \Rightarrow x = 0$ $9 + x = 18 \Rightarrow x = 9,$

 $x = 27 \Rightarrow x = 18$ which is not possible.

 \therefore The required value of x = 0 or 9.

II. Long answer type questions.





Considering the sum of ones place we get

Tens place will come 7 easily

Now the sum of Hundreds place; 1 will come as carry over and M + 1 is resulting of 2 digits, i.e., B and U, so, M must be 9.

Hence, the final value be

983 86 8

1077

Hence, M = 9, S = 6, B = 1, U = 0.

2. Fill in the boxes with the correct digits.

3 🗆 4 🗖	(I Row)
x 37 1	(II Row)
	(III Row)
□ □ 3 □ 2 x	(I V Row)
9 1 🗆 8 x x	(V Row)
	(VI Row)

Sol. Give number to each row. Since all blanks are given for multiplication by 1 in 371.

 \therefore We will look for 7.

The units digit is given as 2 (see I V Row)

We know, $7 \times 6 = 42$

Unit digit for number in I Row is 6

Now, multiply 7 by 4, to complete IV Row and I Row.

Thus we have,

3 🗆 4 🗖

(II Row)

(III Row)

(I V Row)

(I Row)

Dubese
•••3•••2 x
9 1 🗆 8 x x

x 371

(VI Row)

(V Row)



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Now, the whole multiplication can easily be completed as we have got both the numbe to be multiplied with.

3046
x 3 7 1
3046
2 1 3 2 2 x
9 1 3 8 x x
11 3 0 0 6 6

3. Without performing actual computation, write the quotient when sum of all possibly

(ii) 17.

3-digit numbers formed by three digits 4, 6, 7 is divided by:

(i) 222.

Sol. (i) We know that when the sum of all possible 3-digit numbers for med by given three digits is divided by 222 gives quotient the sum of the digits. So, the sum of all possible 3-digit numbers for med by three digits 4, 6, 7 when divided by 222 gives quotient 17(4 + 6 + 7)

(ii) We know that when the sum of all possible 3-digit numbers formed by given t hive digits is divided by sum of the digits gives quotient 222. So, the sum of all possible 3-digit numbers formed by three digits 4, 6, 7 when divided by 17(4 + 6 + 7) gives quotient 222.

4. Find the value of A, B, C, D, E, F, G and H to complete the procedure of division.

Sol. In the puzzle, first number of quotient is 5.

So,
$$9 \times 5 = DE \Rightarrow 45 = DE \Rightarrow D = 4$$
 and $E = 5$
Now, $48 - 45 = 3$. Therefore, $A = 8$
Also, to make the number 3F divisible by 9 we must have $F = 6$ and
so $C = 4$ and $B = 6$
Also, since $3F - GH = 0 \Rightarrow 3F = GH$
 $\Rightarrow 36 = GH$ [$\therefore F = 6$]
 $\Rightarrow G = 3$ and $H = 6$
 $(\therefore F = 6]$
 $(\therefore F = 6]$
 $(\Rightarrow G = 3)$ and $H = 6$





- I. High order Thinking Skills [HOTS] Questions.
- 1. a. Find the values of A, B, C, D, E, F and G in the following.

AB) 4CDE (1FG - 28 15D - 140 16E - 16E ×

b. Write a 3 digit number abc as

$$100a + 10b + c = 99a + 11b + (a - b + c)$$

$$= 11 (9a + b) + (a - b + c)$$

If the number is divisible by 11, then what can you say about (a - b + c)? Is it necessary

that (a + c - b)

Should be divisible by 11?

Sol. a. Clearly A = 2, b = 8

Now, (13 - 8) = 5, then c = 3 28) 4CDE (156 - 28 15D - 140 16E -168× $28 \times 5 = 140$ *.*.. F = 5⇒ D - 0 = 6D = 6 \Rightarrow 28 x 6 = 168 Also, School G = 6 and E = 8⇒ Hence, A = 2, B = 8, C = 3, D = 6, E = 8, F = 5 and G = 6

b. Yes! it is necessary that (a - b + c) should be divisible by 11.





- 2. a. Without performing actual division, find the remainder when 28735429 is divisible by 11.
 - b. Can 231 be written is an even digit number, then 28735429 = a multiple
 of 11 + sum of its digits in even places sum of its digits in odd places.
 - = a multiple of 11 + (8 + 4 + 3 + 9) (2 + 7 + 5 + 2)
 - = a multiple of 11 + 24 16
 - = a multiple of 11 + 8

Hence, required number = 8

b. Yes, 231 can be written in the form of 10b + a

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i.e., since (231 - 1) is divisible by 10, then
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231 - 1 = 230 $231 - 1 = 10 \times 23$ $231 - 1 = 10 \times 23 + 1$ 231 = 10b = a

Where a = 1 and b = 23

⇒

 \Rightarrow

 \rightarrow

II. High order Thinking Skills [HOTS] Questions.

1. Given that the number $\overline{148101a095}$ is divisible by 11, where a is some digit, what are possible value of a?

Sol. If $\overline{148101a095}$ is divisible by 11, then (1 + 8 + 0 + a + 9) - (4 + 1 + 1 + 0 + 5) must be a multiple of 11.

 \Rightarrow (a + 18) - 11 is a multiple of 11 \Rightarrow a + 7 should be multiple of 11

It means either a + 7 = 0 or a + 7 = 11 ...(1) or a + 7 = 22 and so on But a is a digit which can vary from 0 to 9 From (1) $a + 7 = 11 \Rightarrow a = 11 - 7 = 4$ Hence, possible value of a = 4.

2. A number trick is given below

"Think of a 3-digit number; add 7 to it; then double it; subtract 4 and then divide it by 2.

Now subtract the original number from this. You will be left with 5!"

Explain how this trick works.

Sol. Let that number be 345





Add 7	\rightarrow	345 + 7 = 352			
Double it	\rightarrow	352 x 2 = 704			
Subtract 4	\rightarrow	704 - 4 = 700			
Divide by 2	→	$\frac{700}{2} = 350$			
Subtract original number → 350 - 345 = 5					
It is required number.					
Explanation: Let the three digit number be abc. Then $abc = 100a + 10b + c$					
Adding 7 gives	\rightarrow	100a + 10b + c + 7			
Double it	\rightarrow	2(100a + 10b + c + 7)			
Subtract 4	\rightarrow	200a + 20b + 2c + 14 - 4			
Divide by 2	→	$\frac{200a}{2} + \frac{20b}{2} + \frac{2c}{2} + \frac{10}{2} = 100a + 10b + c + 5 = abc + 5$			
Subtracting the original number gives $\rightarrow abc + 5 - abc = 5$					

I. Value based questions.

- 1. a. In a 3-digit number, the hundreds digit is twice the tens digit while the units digit is thrice the tens digit. Also, the sum of its digits is 19.
 - b. Write a 4-digit number abcd as

$$1000a + 100b + 10c + d = (1001a + 99b + 11c) - (a - b + c - d)$$
$$= 11 (91a + 9b + c) + [(b = d) - (a + c)]$$

If the number abcd is divisible by 11, then what

can you say about [(b + d) - (a + c)]?

Sol. Let the tens digit = xa. Then hundreds digit = 2xthe units digit and = 3xAccording to condition, tion School 2x + x + 3x = 186x = 18x = 3⇒ Therefore, hundreds digit = $2 \times 3 = 6$ tens digit = 3







Hence, required number = $(100 \times 6 + 10 \times 3 + 9)$

= 639

b. [(b = d) - (a + c)] is divisible by 11.



19