

# 5. Playing with Numbers

## Exercise 5A

### 1. Question

#### Answer

It is given that the units place digit is 3.

So, let tens place digit be  $y$ .

$$\therefore \text{Our number} = (10y + 3) \dots (1)$$

Our given condition is that seven times the sum of the digits is the number itself.

$\therefore$  By given condition,

$$7(y + 3) = (10y + 3)$$

$$7y + 21 = 10y + 3$$

$$\therefore 10y - 7y = 21 - 3$$

$$\therefore 3y = 18$$

$$\therefore y = 6$$

Substituting the value of  $y$  in equation 1,

$$\text{Number} = 10 \times 6 + 3 = 63$$

Hence, required number is 63.

### 2. Question

#### Answer

Our first given condition is that the digit at the unit place is double the digit in the tens place.

$\therefore$  Let the tens digit be  $y$ .

The digit in the units place is  $2y$ .

$$\text{Number} = 10y + 2y = 12y$$

Now the second condition is that the number exceeds the sum of its digits by 18.

∴ By given condition,

$$(y + 2y) + 18 = (10y + 2y)$$

$$∴ 3y + 18 = 12y$$

$$12y - 3y = 18$$

$$9y = 18$$

$$∴ y = 2$$

Hence, the digit in the tens place is 2.

So, digit in the units place is 4.

∴ Our number is 24.

### 3. Question

#### Answer

Let tens place digit be y and the units place be x.

∴ Our number is  $(10y + x)$

Our given first condition is that our number is 3 more than 4 times the sum of its digits.

∴ By given condition,

$$4(y + x) + 3 = (10y + x)$$

$$4y + 4x + 3 = 10y + x$$

$$6y - 3x = 3$$

$$3(2y - x) = 3$$

$$2y - x = 1 \dots (1)$$

Our given second condition is that if 18 is added to the number, its digits are reversed.

The reversed number is  $(10x + y)$

∴ By given condition,

$$(10y + x) + 18 = 10x + y$$

$$10y - y + x - 10x = -18$$

$$9y - 9x = -18$$

$$9(y - x) = -18$$

$$y - x = -2$$

$$y = x - 2 \quad [2] \text{ Putting this value of 'y' in eq (1), we have } 2(x - 2) - x = 12x - 4 - x = 1x = 5$$

From [2],

we have

$$y = 5 - 2 = 3$$

Hence,

$$y = 3 \text{ and } x = 5$$

$$\therefore \text{Our number} = (10 \times 3 + 5) = 35$$

Hence, our number is 35.

#### **4. Question**

##### **Answer**

Let tens place digit be  $y$  and the units place be  $x$ .

$$\therefore \text{Our number is } (10y + x)$$

Our given first condition is that sum of the digits of a two-digit number is 15.

$\therefore$  By given condition,

$$y + x = 15 \dots(1)$$

Our given second condition is that the number obtained by interchanging its digits exceeds the given number by 9.

$\therefore$  By given condition,

$$10y + x + 9 = 10x + y$$

$$\therefore 10y - y + x - 10x = -9$$

$$9y - 9x = -9$$

$$y - x = -1 \dots(2)$$

Solving 1 and 2 simultaneously, we get,

$$\therefore y = 7 \text{ and } x = 8$$

$$\therefore \text{Our number} = (10 \times 7 + 8) = 78$$

Hence, our number is 78.

(Answer given is 48 but correct answer is 78)

#### **5. Question**

##### **Answer**

Let tens place digit be  $y$  and the units place be  $x$ .

$\therefore$  Our number is  $(10y + x)$

Our given first condition is that the difference between a 2-digit number and the number obtained by interchanging its digits is 63.

$\therefore$  By given condition,

$$(10y + x) - (10x + y) = 63$$

$$\therefore 10y - y + x - 10x = 63$$

$$9y - 9x = 63$$

$$9(y - x) = 63$$

$$y - x = 7$$

Hence, the difference between the digits of the number is 7.

#### 6. Question

##### Answer

Let the units place digit be  $x$ .

Our given condition is that the tens digit is thrice the units digit and the hundreds digit is four times the units digit and sum of digits is 16.

$\therefore$  By given condition,

$$4x + 3x + x = 16$$

$$8x = 16]$$

$$x = 2$$

$\therefore$  The number is 862.

## Exercise 5B

#### 1. Question

## Answer

**CLASS24**

(i)

We know that if units place digit is divisible by 2 then our given number is divisible by 2.

Here units place is 4, which is divisible by 2.

Hence, 94 is divisible by 2.

(ii)

We know that if units place digit is divisible by 2 then our given number is divisible by 2.

Here units place is 0, which is divisible by 2.

Hence, 570 is divisible by 2.

(iii)

We know that if units place digit is divisible by 2 then our given number is divisible by 2.

Here units place is 5, which is not divisible by 2.

Hence, 570 is not divisible by 2.

(iv)

We know that if units place digit is divisible by 2 then our given number is divisible by 2.

Here units place is 8, which is divisible by 2.

Hence, 2398 is divisible by 2.

(v)

We know that if units place digit is divisible by 2 then our given number is divisible by 2.

Here units place is 8, which is divisible by 2.

Hence, 79532 is divisible by 2.

(vi)

We know that if units place digit is divisible by 2 then our given number is divisible by 2.

Here units place is 6, which is divisible by 2.

Hence, 13576 is divisible by 2.

(vii)

We know that if units place digit is divisible by 2 then our given number is divisible by 2.

Here units place is 1, which is not divisible by 2.

Hence, 46821 is not divisible by 2.

(viii)

We know that if units place digit is divisible by 2 then our given number is divisible by 2.

Here units place is 3, which is not divisible by 2.

Hence, 84663 is not divisible by 2.

(ix)

We know that if units place digit is divisible by 2 then our given number is divisible by 2.

Here units place is 9, which is not divisible by 2.

Hence, 66669 is not divisible by 2.

## **2. Question**

### **Answer**

(i)

We know that if units place is divisible by 5, ie. units place is having value either of 0 or 5, then our number is divisible by 5.

Here units place is 5, which is divisible by 5.

Hence, 95 is divisible by 5.

(ii)

We know that if units place is divisible by 5, ie. units place is having value either of 0 or 5, then our number is divisible by 5.

Here units place is 0, which is divisible by 5.

Hence, 470 is divisible by 5.

(iii)

We know that if units place is divisible by 5, ie. units place is having value either number is divisible by 5.

Here units place is 6, which is not divisible by 5.

Hence, 1056 is not divisible by 5.

(iv)

We know that if units place is divisible by 5, ie. units place is having value either of 0 or 5, then our number is divisible by 5.

Here units place is 5, which is divisible by 5.

Hence, 2735 is divisible by 5.

(v)

We know that if units place is divisible by 5, ie. units place is having value either of 0 or 5, then our number is divisible by 5.

Here units place is 3, which is not divisible by 5.

Hence, 55053 is not divisible by 5.

(vi)

We know that if units place is divisible by 5, ie. units place is having value either of 0 or 5, then our number is divisible by 5.

Here units place is 0, which is divisible by 5.

Hence, 35790 is divisible by 5.

(vii)

We know that if units place is divisible by 5, ie. units place is having value either of 0 or 5, then our number is divisible by 5.

Here units place is 5, which is divisible by 5.

Hence, 98765 is divisible by 5.

(viii)

We know that if units place is divisible by 5, ie. units place is having value either of 0 or 5, then our number is divisible by 5.

Here units place is 8, which is not divisible by 5.

Hence, 42658 is not divisible by 5.

(ix)

We know that if units place is divisible by 5, ie. units place is having value either of 0 or 5, then our number is divisible by 5.

Here units place is 0, which is divisible by 5.

Hence, 77990 is divisible by 5.

**CLASS24**

### 3. Question

#### Answer

(i)

We know that if units place is divisible by 10, ie. units place is having value 0, then our number is divisible by 10.

Here units place is 5, which is not divisible by 10.

Hence, 205 is not divisible by 10.

(ii)

We know that if units place is divisible by 10, ie. units place is having value 0, then our number is divisible by 10.

Here units place is 0, which is divisible by 10.

Hence, 90 is divisible by 10.

(iii)

We know that if units place is divisible by 10, ie. units place is having value 0, then our number is divisible by 10.

Here units place is 4, which is not divisible by 10.

Hence, 1174 is not divisible by 10.

(iv)

We know that if units place is divisible by 10, ie. units place is having value 0, then our number is divisible by 10.

Here units place is 0, which is divisible by 10.

Hence, 57930 is divisible by 10.

(v)

We know that if units place is divisible by 10, ie. units place is having value 0, then our number is divisible by 10.

Here units place is 5, which is not divisible by 10.



Hence, 60005 is not divisible by 10.

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#### **4. Question**

##### **Answer**

(i)

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here, sum of digits is 11, which is not divisible by 3.

Hence, 83 is not divisible by 3.

(ii)

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here, sum of digits is 18, which is divisible by 3.

Hence, 378 is divisible by 3.

(iii)

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here, sum of digits is 15, which is divisible by 3.

Hence, 474 is divisible by 3.

(iv)

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here, sum of digits is 19, which is not divisible by 3.

Hence, 1693 is not divisible by 3.

(v)

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here, sum of digits is 11, which is not divisible by 3.

Hence, 60005 is not divisible by 3.

(vi)

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here, sum of digits is 21, which is divisible by 3.

Hence, 67035 is divisible by 3.

(vii)

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here, sum of digits is 27, which is divisible by 3.

Hence, 591282 is divisible by 3.

(viii)

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here, sum of digits is 23, which is not divisible by 3.

Hence, 903164 is not divisible by 3.

(ix)

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here, sum of digits is 3, which is divisible by 3.

Hence, 100002 is divisible by 3.

## **5. Question**

### **Answer**

(i)

We know that if sum of digits of a number is divisible by 9, then the number is d

Here, sum of digits is 12, which is not divisible by 9.

Hence, 327 is not divisible by 9.

(ii)

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

Here, sum of digits is 18, which is divisible by 9.

Hence, 7524 is divisible by 9.

(iii)

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

Here, sum of digits is 9, which is divisible by 9.

Hence, 32022 is divisible by 9.

(iv)

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

Here, sum of digits is 15, which is not divisible by 9.

Hence, 64302 is not divisible by 9.

(v)

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

Here, sum of digits is 27, which is divisible by 9.

Hence, 89361 is divisible by 9.

(vi)

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

Here, sum of digits is 30, which is not divisible by 9.

Hence, 14799 is not divisible by 9.

(vii)

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

Here, sum of digits is 36, which is divisible by 9.

Hence, 66888 is divisible by 9.

(viii)

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

Here, sum of digits is 9, which is divisible by 9.

Hence, 30006 is divisible by 9.

(ix)

We know that if sum of digits of a number is divisible by 9, then the number is d

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Here, sum of digits is 15, which is not divisible by 9.

Hence, 33333 is not divisible by 9.

## **6. Question**

### **Answer**

We know that if number formed by last two digits of a given number is divisible by 4, then entire given number is divisible by 4.

Here, number formed by last two digits is 34, which is not divisible by 4.

Hence, 134 is not divisible by 4.

(ii)

We know that if number formed by last two digits of a given number is divisible by 4, then entire given number is divisible by 4.

Here, number formed by last two digits is 18, which is not divisible by 4.

Hence, 618 is not divisible by 4.

(iii)

We know that if number formed by last two digits of a given number is divisible by 4, then entire given number is divisible by 4.

Here, number formed by last two digits is 28, which is divisible by 4.

Hence, 3928 is divisible by 4.

(iv)

We know that if number formed by last two digits of a given number is divisible | given number is divisible by 4.

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Here, number formed by last two digits is 76, which is divisible by 4.

Hence, 50176 is divisible by 4.

(v)

We know that if number formed by last two digits of a given number is divisible by 4, then entire given number is divisible by 4.

Here, number formed by last two digits is 92, which is divisible by 4.

Hence, 39392 is divisible by 4.

(vi)

We know that if number formed by last two digits of a given number is divisible by 4, then entire given number is divisible by 4.

Here, number formed by last two digits is 94, which is not divisible by 4.

Hence, 56794 is not divisible by 4.

(vii)

We know that if number formed by last two digits of a given number is divisible by 4, then entire given number is divisible by 4.

Here, number formed by last two digits is 02, which is not divisible by 4.

Hence, 86102 is not divisible by 4.

(viii)

We know that if number formed by last two digits of a given number is divisible by 4, then entire given number is divisible by 4.

Here, number formed by last two digits is 66, which is not divisible by 4.

Hence, 66666 is not divisible by 4.

(ix)

We know that if number formed by last two digits of a given number is divisible by 4, then entire given number is divisible by 4.

Here, number formed by last two digits is 18, which is not divisible by 4.

Hence, 99918 is not divisible by 4.

(x)

We know that if number formed by last two digits of a given number is divisible by 4, then entire given number is divisible by 4.

Here, number formed by last two digits is 36, which is divisible by 4.

Hence, 77736 is divisible by 4.

## 7. Question

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### Answer

(i)

We know that if number formed by last three digits of a given number is divisible by 8, then entire given number is divisible by 8.

Here, number formed by last three digits is 132, which is not divisible by 8.

Hence, 6132 is not divisible by 8.

(ii)

We know that if number formed by last three digits of a given number is divisible by 8, then entire given number is divisible by 8.

Here, number formed by last three digits is 304, which is divisible by 8.

Hence, 7304 is divisible by 8.

(iii)

We know that if number formed by last three digits of a given number is divisible by 8, then entire given number is divisible by 8.

Here, number formed by last three digits is 312, which is divisible by 8.

Hence, 59312 is divisible by 8.

(iv)

We know that if number formed by last three digits of a given number is divisible by 8, then entire given number is divisible by 8.

Here, number formed by last three digits is 664, which is divisible by 8.

Hence, 66664 is divisible by 8.

(v)

We know that if number formed by last three digits of a given number is divisible by 8, then entire given number is divisible by 8.

Here, number formed by last three digits is 444, which is not divisible by 8.

Hence, 44444 is not divisible by 8.

(vi)

We know that if number formed by last three digits of a given number is divisible by 8, then entire given number is divisible by 8.

Here, number formed by last three digits is 360, which is divisible by 8.

Hence, 154360 is divisible by 8.

(vii)

We know that if number formed by last three digits of a given number is divisible by 8, then entire given number is divisible by 8.

Here, number formed by last three digits is 818, which is not divisible by 8.

Hence, 998818 is not divisible by 8.

(viii)

We know that if number formed by last three digits of a given number is divisible by 8, then entire given number is divisible by 8.

Here, number formed by last three digits is 472, which is divisible by 8.

Hence, 265472 is divisible by 8.

(ix)

We know that if number formed by last three digits of a given number is divisible by 8, then entire given number is divisible by 8.

Here, number formed by last three digits is 162, which is not divisible by 8.

Hence, 7350162 is not divisible by 8.

### **8. Question**



## Answer

## CLASS24

(i)

We know that if the difference of the sum of alternative digits of a number, i.e. digits which are in odd places together and digits in even places together, is divisible by 11 then that number is divisible by 11.

Here, sum of digits in odd places = 6 and sum of digits in even places = 4

∴ The difference of the sum of alternative digits of a number is 2, which is not divisible by 11.

Hence, 22222 is not divisible by 11.

(ii)

We know that if the difference of the sum of alternative digits of a number, i.e. digits which are in odd places together and digits in even places together, is divisible by 11 then that number is divisible by 11.

Here, sum of digits in odd places = 12 and sum of digits in even places = 12

∴ The difference of the sum of alternative digits of a number is 0, which is divisible by 11.

Hence, 444444 is divisible by 11.

(iii)

We know that if the difference of the sum of alternative digits of a number, i.e. digits which are in odd places together and digits in even places together, is divisible by 11 then that number is divisible by 11.

Here, sum of digits in odd places = 17 and sum of digits in even places = 17

∴ The difference of the sum of alternative digits of a number is 0, which is divisible by 11.

Hence, 379654 is divisible by 11.

(iv)

We know that if the difference of the sum of alternative digits of a number, i.e. digits which are in odd places together and digits in even places together, is divisible by 11 then that number is divisible by 11.

Here, sum of digits in odd places = 17 and sum of digits in even places = 15

∴ The difference of the sum of alternative digits of a number is 2, which is not divisible by 11.

Hence, 1057982 is not divisible by 11.

(v)

We know that if the difference of the sum of alternative digits of a number, i.e. digits which are in odd places together and digits in even places together, is divisible by 11 then that number is divisible by 11.



Here, sum of digits in odd places = 19 and sum of digits in even places = 8

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∴ The difference of the sum of alternative digits of a number is 11, which is divisible by 11.

Hence, 6543207 is divisible by 11.

(vi)

We know that if the difference of the sum of alternative digits of a number, i.e. digits which are in odd places together and digits in even places together, is divisible by 11 then that number is divisible by 11.

Here, sum of digits in odd places = 8 and sum of digits in even places = 19

∴ The difference of the sum of alternative digits of a number is 11, which is divisible by 11.

Hence, 818532 is divisible by 11.

(vii)

We know that if the difference of the sum of alternative digits of a number, i.e. digits which are in odd places together and digits in even places together, is divisible by 11 then that number is divisible by 11.

Here, sum of digits in odd places = 4 and sum of digits in even places = 15

∴ The difference of the sum of alternative digits of a number is 11, which is divisible by 11.

Hence, 900163 is divisible by 11.

(viii)

We know that if the difference of the sum of alternative digits of a number, i.e. digits which are in odd places together and digits in even places together, is divisible by 11 then that number is divisible by 11.

Here, sum of digits in odd places = 18 and sum of digits in even places = 8

∴ The difference of the sum of alternative digits of a number is 10, which is not divisible by 11.

Hence, 7531622 is not divisible by 11.

## 9. Question

**Answer**

(i)

We know that if number formed by removing last digit is subtracted by double of removed digit, is divisible by 7, then our given number is divisible by 7.

Here last digit is 3.

$\therefore$  Number to be tested =  $69 - 2 \times 3 = 63$ , which is divisible by 7.

Hence, 693 is divisible by 7.

(ii)

We know that if number formed by removing last digit is subtracted by double of removed digit, is divisible by 7, then our given number is divisible by 7.

Here last digit is 6.

$\therefore$  Number to be tested =  $789 - 2 \times 6 = 777$ , which is divisible by 7.

Hence, 7896 is divisible by 7.

(iii)

We know that if number formed by removing last digit is subtracted by double of removed digit, is divisible by 7, then our given number is divisible by 7.

Here last digit is 7.

$\therefore$  Number to be tested =  $346 - 2 \times 7 = 332$ .

Again repeating the process, taking last digit 2 for number 332,

Number to be tested =  $33 - 2 \times 4 = 19$ , which is not divisible by 7.

Hence, 3467 is not divisible by 7.

(iv)

We know that if number formed by removing last digit is subtracted by double of removed digit, is divisible by 7, then our given number is divisible by 7.

Here last digit is 3.

$\therefore$  Number to be tested =  $1287 - 2 \times 3 = 1281$ .

Again repeating the process, taking last digit 1 for number 1281,

Number to be tested =  $128 - 2 \times 1 = 126$ , which is divisible by 7.

Hence, 12873 is divisible by 7.

(v)

We know that if number formed by removing last digit is subtracted by double of removed digit, is divisible by 7, then our given number is divisible by 7.

Here last digit is 6.

$$\therefore \text{Number to be tested} = 6543 - 2 \times 6 = 6531.$$

Again repeating the process, taking last digit 1 for number 6531,

$$\text{Number to be tested} = 653 - 2 \times 1 = 651$$

Again repeating the process, taking last digit 1 for number 651,

$$\text{Number to be tested} = 65 - 2 \times 1 = 63, \text{ which is divisible by 7.}$$

Hence, 65436 is divisible by 7.

(vi)

We know that if number formed by removing last digit is subtracted by double of removed digit, is divisible by 7, then our given number is divisible by 7.

Here last digit is 6.

$$\therefore \text{Number to be tested} = 5463 - 2 \times 6 = 5451$$

Again repeating the process, taking last digit 1 for number 5451,

$$\text{Number to be tested} = 545 - 2 \times 1 = 543$$

Again repeating the process, taking last digit 3 for number 543,

$$\text{Number to be tested} = 54 - 2 \times 3 = 48, \text{ which is not divisible by 7.}$$

Hence, 54636 is not divisible by 7.

(vii)

We know that if number formed by removing last digit is subtracted by double of removed digit, is divisible by 7, then our given number is divisible by 7.

Here last digit is 5.

$$\therefore \text{Number to be tested} = 9817 - 2 \times 5 = 9807.$$

Again repeating the process, taking last digit 7 for number 9807,

$$\text{Number to be tested} = 980 - 2 \times 7 = 966$$

Again repeating the process, taking last digit 6 for number 966,

$$\text{Number to be tested} = 96 - 2 \times 6 = 84, \text{ which is divisible by 7.}$$

Hence, 98175 is divisible by 7.

(viii)

We know that if number formed by removing last digit is subtracted by double of removed digit, is divisible by 7, then our given number is divisible by 7.

Here last digit is 7.

$$\therefore \text{Number to be tested} = 8877 - 2 \times 7 = 8863.$$

Again repeating the process, taking last digit 3 for number 8863,

Number to be tested =  $886 - 2 \times 3 = 880$

Here, last digit is 0. So, last digit will not be considered.

Hence, our number testing number will be 88, which is not divisible by 7.

Hence, 88777 is not divisible by 7.

#### **10. Question**

##### **Answer**

Here, our given number is  $7x3$ , which is divisible by 3.

We know that if number is divisible by 3 only when sum of digits of given number is divisible by 3.

Hence, if  $7x3$  is divisible by 3, then,

$$7 + x + 3 = 0, 3, 6, 9, 12, \dots$$

$$\therefore 10 + x = \text{multiple of } 3.$$

$$\text{Hence, } x = (\text{multiple of } 3) - 10$$

Here, possible values for multiples of 3 are 12, 15 and 18

Hence,  $x = 2, 5$  or  $8$

Hence, possible numbers are 723, 753 and 783

#### **11. Question**

##### **Answer**

Here, our given number is  $53y1$ , which is divisible by 3.

We know that if number is divisible by 3 only when sum of digits of given number is divisible by 3.

Hence, if  $53y1$  is divisible by 3, then,

$$5 + 3 + y + 1 = 0, 3, 6, 9, 12, \dots$$

$$\therefore 9 + y = \text{multiple of } 3.$$

$$\text{Hence, } y = (\text{multiple of } 3) - 9$$

Here, possible values for multiples of 3 are 9, 12, 15 and 18

Hence,  $y = 0, 3, 6$  and  $9$

Hence, possible numbers are 5301, 5331, 5361 and 5391.

(In given answer, 5301 is not considered)

#### **12. Question**

**Answer****CLASS24**

Here, our given number is  $x806$ , which is divisible by 9.

We know that if number is divisible by 9 only when sum of digits of given number is divisible by 9.

Hence, if  $x806$  is divisible by 9, then,

$$X + 8 + 0 + 6 = 0, 9, 18, \dots$$

$$\therefore 14 + x = \text{multiple of } 9.$$

$$\text{Hence, } x = (\text{multiple of } 9) - 14$$

Here, possible values for multiples of 9 is 18

$$\text{Hence, } x = 4$$

$$\therefore \text{Possible number is } 4806.$$

**13. Question****Answer**

Here, our given number is  $471z8$ , which is divisible by 9.

We know that if number is divisible by 9 only when sum of digits of given number is divisible by 9.

Hence, if  $471z8$  is divisible by 9, then,

$$4 + 7 + 1 + z + 8 = 0, 9, 18, \dots$$

$$\therefore 20 + z = \text{multiple of } 9.$$

$$\text{Hence, } z = (\text{multiple of } 9) - 20$$

Here, possible values for multiples of 9 is 27

$$\text{Hence, } z = 7$$

$$\therefore \text{Possible number is } 47178$$

**14. Question****Answer**

Examples of numbers, such that each one of which is divisible by 3 but not divisible by 9, are 21, 24, 30, 33 and 39.

**15. Question****Answer**

## Exercise 5C

**CLASS24**

### 1. Question

#### Answer

Here, in units place,

$$A + 7 = 3$$

Ie,  $A = -4$ , which is not possible.

Hence A is greater than 10, where, 1 carry is given to tens place.

$$\therefore A + 7 = 13$$

$$\therefore A = 6$$

Now in tens place,

$$5 + 8 + 1 = B \text{ ...as 1 is carried}$$

$$\therefore B = 14$$

Here, 1 will be carried to hundreds place.

Hence,  $B = 4$  and  $C = 1$

### 2. Question

#### Answer

Here, in units place,

$$6 + A = 3$$

Ie.  $A = -3$ , which is not possible.

Hence A is greater than 10, where, 1 carry is given to tens place.

$$\therefore A + 6 = 13$$

$$\therefore A = 7$$

Now, in tens place,

$B + 9 + 1 = 7 \dots$  as 1 is carried

$\therefore B = -3$ , which is not possible.

Hence B is greater than 10, where, 1 carry is given to hundreds place.

$$\therefore B + 9 + 1 = 17$$

$$\therefore B = 7$$

Now, in hundreds place,

$C + 6 + 1 = 1 \dots$  as 1 is carried

I.e.  $C = -6$ , which is not possible.

Hence C is greater than 10, where, 1 carry is given to thousands place.

$$\therefore C + 6 + 1 = 11$$

$$\therefore C = 4$$

### 3. Question

#### Answer

Here, in units place,

$$A + A + A = A$$

I.e.  $3A = A$ , ie.  $3 = 1$  which is wrong.

Hence A is greater than 10, where, 1 carry is given to tens place.

$$\therefore A + A + A = A + 10$$

$$\therefore 3A = A + 10$$

$$\therefore 2A = 10$$

$$\therefore A = 5$$

Now, in tens place,

$B = 1 \dots$  as 1 is carried

### 4. Question

**Answer****CLASS24**

Here, in tens place,

$$6 - 3 = 3$$

Which implies that maximum value of A is 3

$$\text{I.e. } A \leq 3$$

Now in units place,

$$A - B = 7$$

This states that borrowing is involved.

$\therefore$  in tens place,

$$6 - A - 1 = 3$$

$$\therefore A = 2$$

Now in units place,

$$A + 10 - B = 7 \text{ ...as borrowing is involved}$$

$$\therefore 12 - B = 7$$

$$\therefore B = 5$$

**5. Question****Answer**

Now in units place,

$$5 - A = 9$$

This states that borrowing is involved.

$$\text{I.e. } 10 + 5 - A = 9$$

$$\therefore A = 6$$

Now in tens place, as 1 is borrowed from hundreds place and also lent,

$$B - 5 + 10 - 1 = 8$$

$$B = 4$$

Now in hundred place, as 1 is lent,

$$C - 2 - 1 = 2$$

$$C = 5$$



## 6. Question

**CLASS24**

### Answer

Here,  $(B \times 3) = B$

Here, B can be either 0 or 5, which satisfies above condition.

If B is 5, then 1 will be carried,

then,  $A \times 3 + 1 = A$  will not be possible for any number

$\therefore B = 0$

Also,  $A \times 3 = A$  is possible for either 0 or 5.

If we take  $A=0$ , then all number will become 0, which is not possible

$\therefore A = 5$

So, 1 will be carried.

$\therefore C = 1$

## 7. Question

### Answer

Here, we can observe that  $B \times A = B$

i.e.  $A = 1$

Here,

First digit =  $B+1$  Thus, 1 will be carried from  $1+B^2$  and becomes  $(B+1)(B^2-9)$   $\therefore C = B^2 - 9$  Now, all  $B$ ,  $B+1$  and  $B^2 - 9$  are one digit number. This condition is satisfied for  $B=3$  or  $B=4$ . For  $B < 3$ ,  $B^2 - 9$  will be negative. For  $B > 3$ ,  $B^2 - 9$  will become a two digit number. For  $B=3$ ,  $C = 3^2 - 9 = 9 - 9 = 0$  For  $B = 4$ ,  $C = 4^2 - 9 = 16 - 9 = 7$

Hence,  $A=1, B=3, C = 0$  or  $A=1, B=4, C = 7$

## 8. Question

**Answer**

Here,

$$(A-4) = 3$$

$$\therefore A = 7$$

$$\text{Now, } C \times 6 = 36$$

$$\therefore C = 6$$

$$\text{Clearly, } B = 6 \therefore A=7, B=C=6$$

**9. Question****Answer**

Clearly, for given condition which is, two numbers whose product is a 1-digit number and the sum is a 2-digit number, 1 and 9 satisfy.

Here,

$$1 \times 9 = 9 \text{ and } 1 + 9 = 10$$

Hence, 1 and 9 are required numbers

**10. Question****Answer**

Clearly, for given condition which is, three whole numbers whose product and sum are equal, 1, 2 and 3 satisfy.

$$\text{Here, } 1 + 2 + 3 = 1 \times 2 \times 3 = 6$$

**11. Question**

**Answer**

Solving for diagonal,

$$6 + 5 + x = 15$$

$$\therefore x = 4$$

6	1	
	5	
		4

Solving for first row,

$$6 + 1 + x = 15$$

$$\therefore x = 8$$

6	1	8
	5	
		4

Solving for last column,

$$8 + x + 4 = 15$$

$$\therefore x = 3$$

6	1	8
	5	3
		4

Solving for second row,

$$x + 5 + 3 = 15$$

$$\therefore x = 7$$

6	1	8
7	5	3
		4

Solving for first column,

$$6 + 7 + x = 15$$

$$\therefore x = 2$$

6	1	8
7	5	3
2		4

Solving second column,

$$1 + 5 + x = 15$$

$$\therefore x = 9$$

$\therefore$

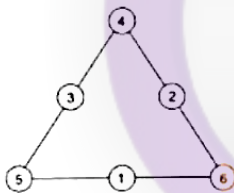
6	1	8
7	5	3
2	9	4

**12. Question**

**Answer**

Place the largest numbers, i.e., 4, 5 and 6, at the three corners of the triangle. Now,  $4 + 5 = 9$ ,  $4 + 6 = 10$  and  $5 + 6 = 11$

Therefore, by placing 3 between 4 and 5, 2 between 4 and 6, and 1 between 5 and 6 we get the desired magic triangle.



**13. Question**

**Answer**

Here  $a = 8$  and  $b = 13$

The numbers in the Fibonacci sequence are arranged in the following manner:

**CLASS24**

1st, 2nd, (1st+2nd), (2nd+3th), (3th+4th), (4th+5th), (5th+6th), (6th+7th), (7th+8th), (8th+9th), (9th+10th)

The numbers are 8, 13, 21, 34, 55, 89, 144, 233, 377 and 610.

Sum of the numbers =  $8+13+21+34+55+89+144+233+377+610$

=1584

$11 \times 7\text{th number} = 11 \times 144 = 1584$

#### 14. Question

#### Answer

Here, sum of last column =  $0 + 11 + 7 + 12$

Solving for last row,

$$x + 2 + 1 + 12 = 30$$

$$\therefore x = 15$$

	14		0
8		6	11
4			7
15	2	1	12

Solving for first column,

$$x + 8 + 4 + 15 = 30$$

$$\therefore x = 3$$

3	14		0
8		6	11
4			7
15	2	1	12

Solving for first row,

$$3 + 14 + x + 0 = 30$$

$$\therefore x = 13$$



3	14	13	0
8		6	11
4			7
15	2	1	12

Solving for second row,

$$8 + x + 6 + 11 = 30$$

$$\therefore x = 5$$

3	14	13	0
8	5	6	11
4			7
15	2	1	12

Solving for second column,

$$14 + 5 + x + 2 = 30$$

$$\therefore x = 9$$

3	14	13	0
8	5	6	11
4	9		7
15	2	1	12

Solving for third column,

$$13 + 6 + x + 1 = 30$$

$$\therefore x = 10$$

3	14	13	0
8	5	6	11
4	9	10	7
15	2	1	12

## Exercise 5D

### 1. Question

**Answer****CLASS24**

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here,

$$5 + x + 6 = \text{multiple of } 3$$

$$\therefore 11 + x = 0, 3, 6, 9, \dots$$

Hence,

$$11 + x = 12$$

$$\therefore x = 1$$

the least value of x is 1

**2. Question****Answer**

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here,

$$6 + 4 + y + 8 = \text{multiple of } 3$$

$$18 + y = 0, 3, 6, 9, \dots$$

Hence,

$$18 + y = 18$$

$$\therefore y = 0$$

the least value of y is 0.

**3. Question**

**Answer****CLASS24**

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

Here,

$$7 + x + 8 = \text{multiple of } 9$$

$$15 + x = 0, 9, 18, \dots$$

Hence,

$$15 + x = 18$$

$$\therefore x = 3$$

$\therefore$  the least value of  $y$  is 3

**4. Question****Answer**

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

Here,

$$3 + 7 + y + 4 = \text{multiple of } 9$$

$$y + 14 = 0, 9, 18, \dots$$

Hence,

$$y = 4$$

$\therefore$  the least value of  $y$  is 3

**5. Question**

**Answer**

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here,

$$4 + x + y + 7 = \text{multiple of } 3$$

$$x + y + 11 = 0, 3, 6, 9, \dots$$

Hence,

$$x + y + 11 = 12$$

$$\therefore x + y = 1$$

$\therefore$  the least value of  $(x + y)$  is 1

**6. Question****Answer**

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here,

$$x + 7 + y + 5 = \text{multiple of } 3$$

$$x + y + 12 = 0, 3, 6, 9, \dots$$

Hence,

$$x + y + 12 = 12$$

$$\therefore x + y = 0$$

But  $x + y$  cannot be 0 because then  $x$  and  $y$  both will have to be 0. Since  $x$  is the first digit, it cannot be 0.  $\therefore x + y + 12 = 15$

$$x + y = 3$$

$\therefore$  the least value of  $(x + y)$  is 3

**7. Question**

**Answer****CLASS24**

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

Here,

$$x + 4 + y + 5 + z = \text{multiple of } 9$$

$$x + y + z + 9 = 0, 9, 18, \dots$$

Hence,

$$x + y + z + 18 = 18$$

But  $x + y + z$  cannot be 0 because then  $x$ ,  $y$  and  $z$  will have to be 0. Since  $x$  is the first digit, it cannot be 0.  $\therefore x + y + z + 18 = 27$

$$x + y + z = 9$$

$\therefore$  the least value of  $(x + y)$  is 9

**8. Question****Answer**

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

Here,

$$1 + A + 2 + B + 5 = \text{multiple of } 9$$

$$A + B + 8 = 0, 9, 18, \dots$$

Hence,

$$A + B + 8 = 9$$

$$A + B = 1$$

**9. Question**

**Answer****CLASS24**

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

Here,

$$x + 2 + 7 + y = \text{multiple of } 9$$

$$x + y + 9 = 0, 9, 18, \dots$$

Hence,

$$x + y + 9 = 9$$

$$\therefore x + y = 0$$

But  $x + y$  cannot be 0 because then  $x$  and  $y$  both will have to be 0. Since  $x$  is the first digit, it cannot be 0.  $\therefore x + y + 9 = 18$

$$x + y = 9$$

$\therefore$  the least value of  $(x + y)$  is 9

## CCE Test Paper-5

**1. Question****Answer**

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here,

$$3 + 2 + 0 + x = \text{multiple of } 3$$

$$5 + x = 0, 3, 6, 9, 12, 15, \dots$$

Hence,

$$1) 5 + x = 6$$

$$\therefore x = 1$$

$$2) 5 + x = 9$$

$$\therefore x = 4$$

$$3) 5 + x = 12$$

$$\therefore x = 7$$

Hence, possible number 3201, 3204 and 3207.

**CLASS24**

## 2. Question

### Answer

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

Here,

$$6 + 4 + y + 3 = \text{multiple of } 9$$

$$y + 13 = 0, 9, 18, \dots$$

Hence,

$$y + 13 = 18$$

$$\therefore y = 5$$

The number will be 6453.

## 3. Question

### Answer

Let the two numbers of the two-digit number be 'a' and 'b'.

$$a + b = 6 \dots (1)$$

The number can be written as  $(10a + b)$ .

After interchanging the digits, the number becomes  $(10b + a)$ .

$$(10a + b) + 18 = (10b + a) \quad 9a - 9b = -18$$

$$a - b = -2 \dots (2)$$

Adding equations (1) and (2):

$$2a = 4$$

$$\therefore a = 2$$

Using  $a = 2$  in equation (1),

$$b = 6 - a = 6 - 2 = 4$$

Therefore, the original number is 24.

## 4. Question



**Answer**

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

Here, sum of digits is 26, which is not divisible by 9.

Hence, 524618 is not divisible by 9.

(ii) 7345845

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

Here, sum of digits is 36, which is divisible by 9.

Hence, 7345845 is divisible by 9.

(iii) 8987148

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

Here, sum of digits is 45, which is divisible by 9.

Hence, 8987148 is divisible by 9.

**5. Question****Answer**

Here, in units place,

$$A - 8 = 3$$

This implies that 1 is borrowed.

$$11 - 8 = 3$$

$$\therefore A = 1$$

Now in tens place, Then,  $7 - B = 9$

1 is borrowed from 7.

$$\therefore 16 - B = 9$$

$$\therefore B = 7$$

Now in hundreds place,

$$5 - C = 2$$

But 1 has been borrowed from 5.

$$\therefore 4 - C = 2$$

$$\therefore C = 2$$

$$\therefore A = 1, B = 7 \text{ and } C = 2$$

#### 6. Question

##### Answer

Here,

$$(A - 6) = 6$$

$$\therefore A = 12$$

A can not be two digit number.

Hence, 1 will be borrowed.

$$\text{Now, } C \times 7 = 63$$

$$\therefore C = 9$$

$$\text{Clearly, } B = 3$$

$$\therefore A = 7, B = C = 6$$

#### 7. Question

##### Answer

$$A \times B = B$$

$$\therefore A = 1$$

$$\therefore C = 1 + B^2$$

Also  $1 + B^2$  is a single digit.

$$\therefore B = 2$$

$$C = (1 + B^2) = (1 + 4) = 5$$

$$\therefore A = 1, B = 2 \text{ and } C = 5$$

**8. Question****Answer**

We know that if sum of digits of a number is divisible by 3, then the number is divisible by 3.

Here,

$$7 + x + 8 = \text{multiple of } 3$$

$$x + 15 = 0, 3, 6, 9, \dots$$

Hence,

$$x + 15 = 15$$

$$x = 0$$

$\therefore$  the least value of  $x$  is 0

**9. Question****Answer**

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

Here,

$$6 + x + 5 = \text{multiple of } 9$$

$$x + 11 = 0, 9, 18, \dots$$

Hence,

$$x + 11 = 18$$

$$\therefore x = 7$$

$\therefore$  the least value of  $x$  is 7

**10. Question****Answer**

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

Here,

$$x + 4 + 8 + y = \text{multiple of } 9$$

$$x + y + 12 = 0, 9, 18, \dots$$

Hence,

$$x + 11 = 18$$

$$\therefore x = 7$$

$\therefore$  the least value of  $x$  is 7

**11. Question****Answer**

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

Here, for the given number to be divisible by 9

$$4 + 8 + 6 + * + 7 = \text{multiple of } 9$$

$$* + 25 = 0, 9, 18, \dots (\text{multiple of } 9)$$

Hence,

$$* + 25 = 27 \quad [\text{lowest multiple then}] * = 2$$