## EXERCISE 2.5

1. Test the divisibility of the following numbers by 2 :
(i) 6520
(ii) 984325
(iii) 367314

## Solution:

We know that a natural number is divisible by 2 if $0,2,4,6$ or 8 are unit digits.
(i) 6250

The units digit in 6250 is 0
Therefore, 6250 is divisible by 2 .
(ii) 984325

The units digit in 984325 is 5
Therefore, 984325 is not divisible by 2 .
(iii) 367314

The units digit in 367314 is 4
Therefore, 367314 is divisible by 2 .
2. Test the divisibility of the following numbers by 3:
(i) 70335
(ii) 607439
(iii) 9082746

Solution:
We know that a number is divisible by 3 if the sum of digits is divisible by 3 .
(i) 70335

We know that
$7+0+3+3+5=18$ which is divisible by 3
Therefore, 70335 is divisible by 3 .
(ii) 607439

We know that
$6+0+7+4+3+9=29$ which is not divisible by 3
Therefore, 607439 is not divisible by 3 .
(iii) 9082746

We know that
$9+0+8+2+7+4+6=36$ which is divisible by 3
Therefore, 9082746 is divisible by 3 .
3. Test the divisibility of the following numbers by 6 :
(i) 7020
(ii) 56423
(iii) 732510

Solution:

We know that a number is divisible by 6 if it is divisible by 2 and 3 .
(i) 7020

The units digit in 7020 is 0
So 7020 is divisible by 2 .
In the same way
$7+0+2+0=9$ which is divisible by 3
Therefore, 7020 is divisible by 6 .
(ii) 56423

The units digit in 56423 is 3
So 56423 is not divisible by 2
In the same way
$5+6+4+2+3=20$ which is not divisible by 3
Therefore, 56423 is not divisible by 6 .
(iii) 732510

The units digit in 732510 is 0
So 732510 is divisible by 2
In the same way
$7+3+2+5+1+0=18$ which is divisible by 3
Therefore, 732510 is divisible by 6 .

## 4. Test the divisibility of the following numbers by 4 :

(i) 786532
(ii) 1020531
(iii) 9801523

## Solution:

We know that a natural number is divisible by 4 if the number which is formed by the last two digits is divisible by 4 .
(i) 786532

The number which is formed by last two digits is 32 which is divisible by 4
Therefore, 786532 is divisible by 4 .
(ii) 1020531

The number which is formed by last two digits is 31 which is not divisible by 4
Therefore, 1020531 is not divisible by 4 .
(iii) 9801523

The number which is formed by last two digits is 23 which is not divisible by 4

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Therefore, 9801523 is not divisible by 4 .
5. Test the divisibility of the following numbers by 8 :
(i) 8364
(ii) 7314
(iii) 36712

Solution:
We know that a number is divisible by 8 if the number which is formed by the last three digits is divisible by 8 .
(i) 8364

Number which is formed by the last three digits is 364 which is not divisible by 8 .

Hence, 8364 is not divisible by 8 .
(ii) 7314

Number which is formed by the last three digits is 314 which is not divisible by 8 .
Hence, 7314 is not divisible by 8 .
(iii) 36712

Number which is formed by the last three digits is 712 which is divisible by 8 .
Hence, 36712 is divisible by 8 .
6. Test the divisibility of the following numbers by 9 :
(i) 187245
(ii) 3478
(iii) 547218

Solution:
We know that a number is divisible by 9 if the sum of digits is divisible by 9 .
(i) 187245

Sum of digits $=1+8+7+2+4+5=27$ which is divisible by 9 .
Hence, 187245 is divisible by 9 .
(ii) 3478

Sum of digits $=3+4+7+8=22$ which is not divisible by 9 .
Hence, 3478 is not divisible by 9 .
(iii) 547218

Sum of digits $=5+4+7+2+1+8=27$ which is divisible by 9 .
Hence, 547218 is divisible by 9 .

## 7. Test the divisibility of the following numbers by 11:

(i) 5335
(ii) $\mathbf{7 0 1 6 9 8 0 3}$
(iii) 10000001

Solution:
(i) 5335

Sum of digits at odd places $=5+3=8$
Sum of digits at even places $=3+5=8$
Difference between them $=8-8=0$
Hence, 5335 is divisible by 11 .
(ii) 70169803

Sum of digits at odd places $=7+1+9+0=17$
Sum of digits at even places $=0+6+8+3=17$
Difference between them $=17-17=0$
Hence, 70169803 is divisible by 11 .
(iii) 10000001

Sum of digits at odd places $=1+0+0+0=1$
Sum of digits at even places $=0+0+0+1=1$
Difference between them $=1-1=0$
Hence, 10000001 is divisible by 11 .
8. In each of the following numbers, replace * by the smallest number to make it divisible by 3:
(i) $75 * 5$
(ii) $35 * 64$
(iii) $18 * 71$

Solution:
Replacing * by smallest number in order to make it divisible by 3 .
(i) $75 * 5$

Replacing * by 1 we get
$75 * 5=7515$
By adding the digits we get
$7+5+1+5=18$ which is divisible by 3 .
(ii) $35 * 64$

Replacing * by 0 we get
$35 * 64=35064$
By adding the digits we get
$3+5+0+6+4=18$ which is divisible by 3 .
(iii) $18 * 71$

Replacing * by 1 we get
$18 * 71=18171$
By adding the digits we get
$1+8+1+7+1=18$ which is divisible by 3 .

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9. In each of the following numbers, replace * by the smallest number to make it divisible by 9:
(i) $67 * 19$
(ii) 66784 *
(iii) $538 * 8$

Solution:
(i) $67 * 19$

Sum of digits $=6+7+1+9=23$
We know 27 is the multiple of 9 which is greater than 23 .
So the smallest required number $=27-23=4$
Hence, the smallest required number is 4 .
(ii) 66784 *

Sum of digits $=6+6+7+8+4=31$
We know 36 is the multiple of 9 which is greater than 31 .
So the smallest required number $=36-31=5$
Hence, the smallest required number is 5 .
(iii) $538 * 8$

Sum of digits $=5+3+8+8=24$
We know that 27 is the multiple of 9 which is greater than 24 .
So the smallest required number $=27-24=3$
Hence, the smallest required number is 3 .
10. In each of the following numbers, replace * by the smallest number to make it divisible by 11:
(i) $86 * 72$
(ii) 467 * 91
(iii) $9 * 8071$

Solution:
We know that a number is divisible by 11 if the difference of the sum of alternate digits is 0 or a multiple of 11 .
(i) $86 * 72$

Sum of digits at odd places $=8+$ missing number +2

$$
=10+\text { missing number }
$$

Sum of digits at even places $=6+7=13$
Difference between them $=10+$ missing number -13
So the difference $=$ missing number -3
We know that missing number $-3=0$ as it is a single digit
Missing number $=3$
Therefore, the smallest required number to make it divisible by 11 is 3 .
(ii) 467 * 91

Sum of digits at odd places $=4+7+9=20$
Sum of digits at even places $=6+$ missing number +1

# RD Sharma Solutions for Class 6 Maths Chapter 2 - 

$$
=7+\text { missing number }
$$

Difference between them $=20-(7+$ missing number $)$
So the difference $=13-$ missing number
13 - missing number $=11$ (Since the missing number is a single digit)
Missing number $=2$
Therefore, the smallest required number to make it divisible by 11 is 2 .
(iii) $9 * 8071$

Sum of digits at odd places $=9+8+7=24$
Sum of digits at even places $=$ missing number $+0+1$
$=1+$ missing number
Difference between them $=24-(1+$ missing number $)$
So the difference $=23-$ missing number
$23-$ missing number $=22($ Since 22 is a multiple of 11 and the missing number is a single digit $)$ Missing number $=1$

Therefore, the smallest required number to make it divisible by 11 is 1 .
11. Given an example of a number which is divisible by
(i) 2 but not by 4
(ii) 3 but not by 6
(iii) 4 but not by 8
(iv) both 4 and 8 but not by 32

Solution:
(i) The example of a number which is divisible by 2 but not by 4 is 10 .
(ii) The example of a number which is divisible by 3 but not by 6 is 15 .
(iii) The example of a number which is divisible by 4 but not by 8 is 28 .
(iv) The example of a number which is divisible by both 4 and 8 but not by 32 is 48 .
12. Which of the following statements are true?
(i) If a number is divisible by 3 , it must be divisible by 9 .
(ii) If a number is divisible by 9 , it must be divisible by 3 .
(iii) If a number is divisible by 4 , it must be divisible by 8 .
(iv) If a number is divisible by 8 , it must be divisible by 4 .
(v) A number is divisible by 18 , if it is divisible by both 3 and 6 .
(vi) If a number is divisible by both 9 and 10 , it must be divisible by 90 .
(vii) If a number exactly divides the sum of two numbers, it must exactly divide the numbers separately. (viii) If a number divides three numbers exactly, it must divide their sum exactly.
(ix) If two numbers are co-prime, at least one of them must be a prime number.
( $x$ ) The sum of two consecutive odd numbers is always divisible by 4.
Solution:
(i) False. The number 15 is divisible by 3 but not by 9 .
(ii) True. The number 18 is divisible by 9 and by 3 .
(iii) False. 12 is divisible by 4 but not by 8 .
(iv) True. The number 16 is divisible by 8 and by 4 .
(v) False. 24 is divisible by both 3 and 6 but not divisible by 18 .
(vi) True. 90 is divisible by both 9 and 10 .
(vii) False. The number 10 divides the sum of 18 and 2 but 10 does not divide neither 18 nor 2 .
(viii) True. 2 divides the number 4,6 and 8 and the sum 18 exactly.
(ix) False. The numbers 4 and 9 are co-primes which are composite numbers.
(x) True. The sum $3+5=8$ is divisible by 4 .

