Playing with Numbers

EXERCISE 9 (A)

(Using BODMAS)

Question 1.
19 – (1 + 5) – 3
Solution:
19 – (1 + 5) – 3
= 19 – 6 – 3
= 19 – 9 = 10

Question 2.
30 x 6 + (5 – 2)
Solution:
30 x 6 + (5 – 2)
= 30 x 6 – 3
= 30 x 2 = 60

Question 3.
28 – (3 x 8) + 6
Solution:
28 – (3 x 8) – 6
= 28 – 24 – 6
= 28 – 4 = 24

Question 4.
9 – [(4 – 3) + 2 x 5]
Solution:
9 – [(4 – 3) + 2 x 5]
= 9 – [1 + 10]
= 9 – 11 = -2

Question 5.
[18 – (15 – 5) + 6]
Solution:
[18 -(15 -5) + 6]
= [18 – 3 + 6]
= [18 + 3] = 21

Question 6.
[(4 x 2) – (4 + 2)] + 8
Solution:
[(4 x 2) – (4 – 2)] + 8
= 8 – 2 + 8
= 16 – 2 = 14

Question 7.
48 + 96 – 24 – 6 x 18
Solution:
48 + 96 – 24 – 6 x 18
= 48 + 4 – 6 x 18
= 48 + 4 – 108
= 52 – 108 = -56

Question 8.
22 – [3 – {8 – (4 + 6)}]
Solution:
22 – [3 – {8 – (4 + 6)}]
= 22 – [3 – {8 – 10}]
= 22 – [3 + 2]
= 22 – 5 = 17

Question 9.
$34 - [29 - \{30 + 66 \div (24 - \overline{28 - 26})\}]$
Solution:
= 34 – [29 – {30 + 66 + (24 – 2)}]
= 34 – [29 – {30 + 66 + 22}]
= 34 – [29 – {30 + 3}]
= 34 – [29 – 33]
= 34 – [-4]
= 34 + 4 = 38

Question 10.
60 – {16 + (4 x 6 – 8)}
Solution:
60 – {16 + (4 x 6 – 8)}
= 60 – {16 + (24 – 8)}
= 60 – {16 + 16}
= 60 – 1 = 59

Question 11.
$25 - [12 - \{5 + 18 \div (4 - \overline{5 - 3})\}]$
Solution:
25 – [12 – {5 + 18 + (4 – 5 – 3)}]
= 25 – [12 – {5 + 18 + (4 – 2)}]
= 25 – [12 – {5 + 18 + 2}]
= 25 – [12 – {5 + 9}]
= 25 – [12 – 14]

= 25 – [-2]
= 25 + 2 = 27

Question 12.
15 – [16 – {12 + 21 ÷ (9 – 2)}]
Solution:
15 – [16 – {12 + 21 ÷ (9 – 2)}]
= 15 – [16 – {12 + 21 ÷ 7}]
= 15 – [16 – {12 + 3}]
= 15 – [16 – 15]
= 15 – 1 = 14

EXERCISE 9 (B)

Question 1.
Fill in the blanks :
(i) On dividing 9 by 7, quotient = ……. and remainder = …….
(ii) On dividing 18 by 6, quotient = ……. and remainder = …….
(iii) Factor of a number is …….. of ……..
(iv) Every number is a factor of ……..
(v) Every number is a multiple of ……..
(vi) ……. is factor of every number.
(vii) For every number, its factors are …… and its multiples are ……..
(viii) x is a factor of y, then y is a …… of x.
Solution:
(i) On dividing 9 by 7, quotient = **1** and remainder = **3**
(ii) On dividing 18 by 6, quotient = **3** and remainder = **0**
(iii) Factor of a number is **an exact division** of **the number**
(iv) Every number is a factor of **itself**
(v) Every number is a multiple of **itself**
(vi) **One** is factor of every number.
(vii) For every number, its factors are **finite** and its multiples are **infinite**
(viii) x is a factor of y, then y is a **multiple** of x.

Question 2.
Write all the factors of :
(i) 16
(ii) 21
(iii) 39
(iv) 48
(v) 64
(vi) 98
Solution:
(i) 16
All factors of 16 are : 1, 2, 4, 8, 16

(ii) 21
All factors of 21 are : 1, 3, 7, 21.
(iii) 39
All factors of 39 are : 1, 3, 13, 39
(iv) 48
All factors of 48 are : 1, 2, 3, 4, 6, 8, 12, 16, 24, 48
(v) 64
All factors of 64 are : 1, 2, 4, 8, 16, 32, 64
(vi) 98
All factors of 98 are : 1, 2, 7, 14, 49, 98

Question 3.
Write the first six multiples of :
(i) 4
(ii) 9
(iii) 11
(iv) 15
(v) 18
(vi) 16
Solution:
(i) 4
Multiples of 4 =1 x 4, 2 x 4, 3 x 4, 4 x 4, 4 x 5, 4 x 6
First six multiples of 4 are : 4, 8, 12, 16, 20, 24
(ii) 9
Multiples of 9 = 1 x 9, 2 x 9, 3 x 9, 4 x 9, 5 x 9, 6 x 9
First six multiples of 9 are : 9, 18, 27, 36, 45, 54
(iii) 11
Multiples of 11 = 1 x 11, 2 x 11, 3 x 11, 4 x11, 5 x 11, 6 x 11
First six multiples of 11 are : 11, 22, 33, 44, 55, 66
(iv) 15
Multiples of 15 = 1 x 15, 2 x 15, 3 x 15, 4 x 15, 5 x 15, 6 x 15
First six multiples of 15 are : 15, 30, 45, 60, 75, 90
(v) 18
Multiples of 18 = 1 x 18, 2 x 18,3 x 18, 4 x 18, 5 x 18, 6 x 18
First six multiples of 18 are : 18, 32, 54, 72, 90, 108
(vi) 16
Multiples of 16 = 1 x 16, 2 x 16, 3 x 16,4 x 16, 5 x 16, 6 x 16
First six multiples of 16 are : 16, 32, 48, 64, 80, 96

Question 4.
The product of two numbers is 36 and their sum is 13. Find the numbers.
Solution:
Since, 36 = 1 x 36, 2 x 18, 3 x 12, 4 x 9, 6 x 6
Clearly, numbers are 4 and 9

Question 5.
The product of two numbers is 48 and their sum is 16. Find the numbers.
Solution:
Since, 48 = 1 x 48, 2 x 24, 3 x 16, 4 x 12, 6 x 8
Clearly, numbers are 4 and 12.

Question 6.
Write two numbers which differ by 3 and whose product is 54.
Solution:
Since, 54 = 1 x 54, 2 x 27, 3 x 18, 6 x 9
Clearly, numbers are 6 and 9.

Question 7.
Without making any actual division show that 7007 is divisible by 7.
Solution:
7007
= 7000 + 7
= 7 x (1000+ 1)
= 7 x 1001
Clearly, 7007 is divisible by 7.

Question 8.
Without making any actual division, show that 2300023 is divisible by 23.
Solution:
2300023 = 2300000 + 23
= 23 x (100000 + 1)
= 23 x 100001
Clearly, 2300023 is divisible by 23.

Question 9.
Without making any actual division, show that each of the following numbers is divisible by 11.
(i) 11011
(ii) 110011
(iii) 11000011
Solution:
(i) 11011 = 11000+ 11
= 11 x (1000+ 1)
= 11 x 1001
Clearly, 11011 is divisible by 11.
(ii) 110011
= 110000+ 11
= 11 x (10000+ 1)
= 11 x 10001
Clearly, 110011 is divisible by 11.

(iii) 11000011
= 11000000+ 11
= 11 x (1000000+ 1)
= 11 x 1000001
Clearly, 110000 is divisible by 11.

Question 10.
Without actual division, show that each of the following numbers is divisible by 8 :
(i) 1608
(ii) 56008
(iii) 240008
Solution:
(i) 1608
= 1600 + 8
= 8 (200 + 1)
= 8 x 201
Clearly, 1608 is divisible by 8.
(ii) 56008
= 56000 + 8
= 8 x (7000 + 1)
= 8 x 7001
Clearly, 56008 is divisible by 8.
(iii) 240008
= 240000 + 8
= 8 x (30000 + 1)
= 8 x 30001
Clearly, 240008 is divisible by 8.

EXERCISE 9(C)

Question 1.
find which of the following numbers are divisible by 2 :
(i) 352
(ii) 523
(iii) 496
(iv) 649
Solution:
(i) 352
The given number = 352
Digit at unit's place = 2
It is divisible by 2
(ii) 523
The given number = 523
Digit at unit's place = 3
It is not divisible by 2

(iii) 496
The given number = 496
Digit at unit's place = 6
It is divisible by 2
(iv) 649
The given number = 649
Digit at unit's place = 9
It is not divisible by 2

Question 2.
Find which of the following number are divisible by 4 :
(i) 222
(ii) 532
(iii) 678
(iv) 9232
Solution:
(i) 222
The given number = 222
The number formed by ten's and unit's digit is 22, which is not divisible by 4.
222 is not divisible by 4
(ii) 532
The given number = 532
The number formed by ten's and unit's digit is 32, which is divisible by 4.
532 is divisible by 4
(iii) 678
The given number = 678
The number formed by ten's and unit's digit is 78, which is not divisible by 4
678 is not divisible by 4
(iv) 9232
The given number = 9232
The number formed by ten's and unit's digit is 32, which is divisible by 4.
9232 is divisible by 4.

Question 3.
Find the which of the following numbers are divisible by 8 :
(i) 324
(ii) 2536
(iii) 92760
(iv) 444320
Solution:
(i) 324
The given number = 324
The number formed by hundred's, ten's and unit's digit is 324, which is not divisible by 8
324 is not divisible by 8
(ii) 2536
The given number = 2536

The number formed by hundred's, ten's and unit's digit is 536, which is divisible by 8
2536 is divisible by 8
(iii) 92760
The given number = 92760
The number formed by hundred's, ten's and unit's digit is 760, which is divisible by 8
92760 is divisible by 8
(iv) 444320
The given number = 444320
The number formed by hundred's, ten's and unit's digit is 320, which is divisible by 8
444320 is divisible by 8.

Question 4.
Find which of the following numbers are divisible by 3 :
(i) 221
(ii) 543
(iii) 28492
(iv) 92349
Solution:
(i) 221
Sum of digits = 2 + 2 + 1 = 5
Which is not divisible by 3
221 is not divisible by 3.
(ii) 543
Sum of digits = 5 + 4 + 3 = 12
Which is divisible by 3
543 is divisible by 3
(iii) 28492
The given number = 28492
Sum of its digits = 2 +8+4 + 9 + 2 = 25
Which is not divisible by 3
28492 is divisible by 3.
(iv) 92349
The given number = 92349
Sum of its digits = 0 + 2 + 3 + 4 + 9 = 27
Which is divisible by 3
92349 is divisible by 3.

Question 5.
Find which of the following numbers are divisible by 9 :
(i) 1332
(ii) 53247
(iii) 4968
(iv) 200314
Solution:
(i) 1332
The given number = 1332

Sum of its digits = 1 + 3 + 3+ 2 = 9
Which is divisible by 9
1332 is divisible by 9
(ii) 53247
The given number = 53247
Sum of its digits = 5 + 3 + 2 + 4 + 7 = 21
Which is not divisible by 9
53247 is not divisible by 9
(iii) 4968
The given number = 4968
Sum of its digits = 4 + 9 + 6 + 8 = 27
Which is divisible by 9
4968 is divisible by 9
(iv) 200314
The given number = 200314
Sum of its digits = 2 + 0 + 0 + 3 + 1 + 4 = 10
Which is not divisible by 9

Question 6.
Find which of the following number are divisible by 6 :
(i) 324
(ii) 2010
(iii) 33278
(iv) 15505
Solution:
A number which is divisible by 2 and 3 or both then the given number is divisible by 6
(i) 324
The given number = 324
Sum of its digits =3 + 2 + 4 = 9
Which is divisible by 3
The given number is divisible by 6
(ii) 2010
The given number = 2010
Sum of its digits = 2 + 0 + 1 + 0 = 3
Which is divisible by 3
The given number is divisible by 6
(iii) 33278
The given number = 33278
Sum of its digits =3 + 3 + 2 + 7 + 8 = 23
Unit digit is 3 which is odd.
The given number is not divisible by 6.
(iv) 15505
The given number = 15505
Sum of its digits = 1 + 5 + 5 + 0 + 5 = 16
which is divisible by 2.
The given number is divisible by 6.

Question 7.
Find which of the following numbers are divisible by 5 :
(i) 5080
(ii) 66666
(iii) 755
(iv) 9207
Solution:
We know that a number whose units digit is 0 or 5, then the number is divisible by 5.
(i) 5080
Here, unit's digit 0 5080 is divisible by 5.
(ii) 66666
Here, unit's digit is 6.
66666 is not divisible by 5.
(iii) 755
Here, unit's digit is 5.
755 is divisible by 5.
(iv) 9207
Here, unit's digit is 7
9207 is not divisible by 5.

Question 8.
Find which of the following numbers are divisible by 10 :
(i) 9990
(ii) 0
(iii) 847
(iv) 8976
Solution:
We know that a number is divisible by 10 if its ones digit is 0.
(i) 9990
Here, unit's digit is 0
9990 is divisible by 10.
(ii) 0
Here, unit's digit is 0
0 is divisible by 10.
(iii) 847
Here, unit's digit is 7
847 is not divisible by 10.
(iv) 8976
Here, unit's digit is 6
8976 is not divisible by 10.

Question 9.
Find which of the following numbers are divisible by 11 :
(i) 5918
(ii) 68,717
(iii) 3882

(iv) 10857

Solution:

A number is divisible by 11, if the difference of sumof its digits in odd places from the right side and the sum of its digits in even places from the right side is divisible by 11.

(i) 5918

Sum of digits at odd places = 5 + 1=6 and,
sum of digits at even places = 9 + 8= 17
Their difference = 17 – 6 = 11 Which is divisible by 11
5918 is divisible by 11.

(ii) 68, 717

Sum of digits at odd places = 6 + 7 + 7 = 20
and, sum of digits at even places = 8 + 1 =9
Difference = 20 – 9 = 11
which is divisible by 11
68717, is divisible by 11.

(iii) 3882

Sum of digits at odd places = 3 + 8 = 11 and,
Sum of digits at even places = 8 + 2 = 10
Difference = 11 – 10 = 1 Which is not divisible by 11
3882 is not divisible by 11.

(iv) 10857

Sum of digits at odd places =1 + 8 + 7 = 16
and, Sum of digits at even places = 0 + 5 = 5
Difference = 16 – 5 = 11
which is divisible by 11
10857 is divisible by 11.

Question 10.

Find which of the following numbers are divisible by 15 :

(i) 960
(ii) 8295
(iii) 10243
(iv) 5013

Solution:

A number is divisible by 15, if it is divisible by both 3 and 5

(i) 960

960 is divisible by both 3 and 5.
960 is divisible by 15

(ii) 8295

8295 is divisible by both 3 and 5.
8295 is divisible by 15

(iii) 10243

10243 is not divisible by both 3 and 5
10243 is not divisible by 15

(iv) 5013

5013 is divisible by both 3 but is not divisible by 5.
5013 is not divisible by 15.

Question 11.
In each of the following numbers, replace M by the smallest number to make resulting number divisible by 3 :
(i) 64 M 3
(ii) 46 M 46
(iii) 27 M 53
Solution:
(i) 64 M 3
The given number = 64 M 3
Sum of its digit = 6 + 4 + 3 = 13
The number next to 13 which is divisible by 3 is 15
Required smallest number =15 – 13 = 2
(ii) 46 M 46
The given number = 46 M 46
Sum of its digits = 4 + 6 + 4 + 6 = 20
The number next to 20 which is divisible by 3 is 21
Required smallest number = 21 – 20 = 1
(iii) 27 M 53
The given number = 27 M 53
Sum of its digits = 2 + 7 + 5 + 3 = 18
which is divisible by 3
Required smallest number = 0

Question 12.
In each of the following numbers replace M by the smallest number to make resulting number divisible by 9.
(i) 76 M 91
(ii) 77548 M
(iii) 627 M 9
Solution:
(i) 76 M 91
The given number = 76 M 91
Sum of its given digits = 7 + 6 + 9 + 1 = 23
The number next to 23, which is divisible by 9 is 27
Required smallest number = 27 – 23 = 4
(ii) 77548 M
The given number = 77548 M
Sum of its given digits = 7 + 7 + 5 + 4 + 8 = 31
The number next to 31, which is divisible by 9 is 36.
Required smallest number = 36 – 31 = 5
(iii) 627 M 9
The given number = 627 M 9
Sum of its given digits = 6 + 2 + 7 + 9 = 24

The number next to 24, which is divisible by 9 is 27
Required smallest number = 27 – 24 = 3

Question 13.
In each of the following numbers, replace M by the smallest number to make resulting number divisible by 11.
(i) 39 M 2
(ii) 3 M 422
(iii) 70975 M
(iv) 14 M 75
Solution:
(i) 39 M 2
The given number = 39 M 2
Sum of its digits in odd places = 3 + M
Sum of its digits in even place = 9 + 2 = 11
Their Difference = 11 – (3 + M)
11 – (3 + M) = 0 11 – 3 = M M = 8
(ii) 3 M 422
The given number = 3 M 422
Sum of its digits in odd places = 3 + 4 + 2 = 9
Sum of its digit in even places = M + 2
Difference of the two sums = 9 – (M + 2)
9 – (M + 2) = 0
9 – 2 = M
M = 7
(iii) 70975 M
The given number = 70975 M
Sum of its digits in odd places = 0 + 7 + M = 7 + M
Sum of its digit in even places = 5 + 9 + 7 = 21
Difference of the two sums = 21 – (7 + M)
=> 21 – (7 + M) = 0
=> 21 = 7 + M
=> M = 14
Since, M cannot be two digit number M = 14 – 11 = 3
(iv) 14 M 75
The given number = 14 M 75
Sum of its digit in odd places = 1 + M + 5 = M + 6
Sum of its digit in even places = 4 + 7 = 11
11 – (M + 16) = 0
11 = M + 6
11 – 6 = M
M = 5

Question 14.
State, true or false :
(i) If a number is divisible by 4. It is divisible by 8.

(ii) If a number is a factor of 16 and 24, it is a factor of 48.
(iii) If a number is divisible by 18, it is divisible by 3 and 6.
(iv) If a divide b and c completely, then a divides (i) a + b (ii) a – b also completely.

Solution:

(i) False
(ii) True
(iii) True
(iv) True