Divisibility

Exercise-1

Solution 1(1):
The sum of the digits of the number 99 = 9 + 9 = 18
18 is divisible by 3 and 9. Thus, according to the tests for divisibility by 3 and 9, 99 is divisible by 3 and 9.
Difference between the sums obtained by adding alternate digits of the number = 9 – 9 = 0.
Thus according to the test for divisibility by 11, 99 is divisible by 11.
∴ 99 is divisible by 3, 9 and 11.

Solution 1(2):
The digit in the units place of 135 is 5. Thus, according to the test for divisibility by 5, the number 135 is divisible by 5.
The sum of the digits of the number 135 is
1 + 3 + 5 = 9. 9 is divisible by 3 and 9.
Thus according to the tests for divisibility by 3 and 9, 135 is divisible by 3 and 9.
∴ 135 is divisible by 3, 5 and 9.

Solution 1(3):
The sum of the digit of the number 711 = 7 + 1 + 1 = 9, 9 is divisible by 3 and 9. Thus, according to the tests for divisibility by 3 and 9, 711 is divisible by 3 and 9.
∴ 711 is divisible by 3 and 9.

Solution 1(4):
The digit in the units place of 280 is 0. Thus, according to the tests for divisibility by 2, 5 and 10, 280 is divisible by 2, 5 and 10.
The number formed by the digits in the tens place and units place of 280 is 80 which is divisible by 4. Thus according to the test for divisibility by 4, 280 is divisible by 4.
∴ 280 is divisible by 2, 4, 5 and 10.

Solution 1(5):
The digit in the units place of 378 is 8. Thus, according to the test for divisibility by 2, 378 is divisible by 2.
The sum of the digits of the number 378 = 3 + 7 + 8 = 18 and 18 is divisible by 3 and 9.
Thus according to the tests for divisibility by 3 and 9, 378 is divisible by 3 and 9.
378 is divisible by 2 and 3, therefore it is also divisible by 6.
∴ 378 is divisible by 2, 3, 6 and 9.

Solution 1(6):
The digit in the units place of 495 is 5. Thus, according to the test for divisibility by 5, 495 is divisible by 5.

The sum of the digits of the number 495 = 4 + 9 + 5 = 18 and 18 is divisible by 3 and 9. Thus according to the tests for divisibility by 3 and 9, 495 is divisible by 3 and 9.
Difference between the sums obtained by adding alternate digits of the number = (4 + 5) – 9 = 9 – 9 = 0 Thus according to the test for divisibility by 11, 495 is divisible by 11.
∴ 378 is divisible by 3, 5, 9 and 11.

Solution 1(7):
The digit in the units place of 504 is 4. So, according to the test for divisibility by 2, 504 is divisible by 2.
The number formed by the digits in the tens place and units place of 504 is 04 which is divisible by 4. Thus according to the test of divisibility by 4, 504 is divisible by 4.
The sum of the digits of the number 504 = 5 + 0 + 4 = 9 and 9 is divisible by 3 and 9. Thus according to the test for divisibility by 3 and 9, 504 is divisible by 3 and 9.
504 is divisible by 2 and 3 so it is also divisible by 6.
∴ 504 is divisible by 2, 3, 4, 6 and 9.

Solution 1(8):
The digit in the units place of 616 is 6. Thus, according to the test for divisibility by 2, 616 is divisible by 2.
The number formed by the digits in the tens place and units place of 616 is 16 which is divisible by 4. Thus according to the test for divisibility by 4, 616 is divisible by 4.
Difference between the sums obtained by adding alternate digits of the number = (6 + 6) – 1 = 12 – 1 = 11,
Thus according to the test for divisibility by 11, 616 is divisible by 11.
∴ 616 is divisible by 2, 4 and 11.

Solution 1(9):
The digit in the units place of 720 is 0. Thus, according to the tests for divisibility by 2, 5 and 10, 720 is divisible by 2, 5 and 10.
The number formed by the digits in the tens place and units place of 720 is 20 which is divisible by 4. Thus according to the test for divisibility by 4, 720 is divisible by 4.
The sum of the digits of the number 720 = 7 + 2 + 0 = 9 and 9 is divisible by 3 and 9. Thus according to the tests for divisibility by 3 and 9, 720 is divisible by 3 and 9.
720 is divisible by 2 and 3, so it is also divisible by 6.
∴ 720 is divisible by 2, 3, 4, 5, 6, 9 and 10.

Solution 1(10):
The digit in the units place of 2304 is 4. Thus, according to the test for divisibility by 2, 2304 is divisible by 2.
The number formed by the digits in the tens place and units place of 2304 is 04 which is divisible by 4. Thus according to the test for divisibility by 4, 2304 is divisible by 4.
The sum of the digits of the number 2304 = 2 + 3 + 0 + 4 = 9 and 9 is divisible by 3 and 9. Thus according to the tests for divisibility by 3 and 9, 2304 is divisible by 3 and 9.
2304 is divisible by 2 and 3, so it is also divisible by 6.
∴ 2304 is divisible by 2, 3, 4, 6 and 9.

Solution 1(11):

The sum of the digits of the number 4203 = 4 + 2 + 0 + 3 = 9 and 9 is divisible by 3 and 9. Thus according to the tests for divisibility by 3 and 9, 2304 is divisible by 3 and 9.
∴ 4203 is divisible by 3 and 9.

Solution 1(12):

The digit in the units place of 1980 is 0. Thus, according to the tests for divisibility by 2, 5 and 10, 1980 is divisible by 2, 5 and 10.
The sum of the digits of the number 1980 = 1 + 9 + 8 + 0 = 18 and 18 is divisible by 3 and 9. Thus according to the tests for divisibility by 3 and 9, 1980 is divisible by 3 and 9.
The number formed by the digits in the tens place and units place of 1980 is 80 which is divisible by 4. Thus according to the test for divisibility by 4, 1980 is divisible by 4.
1980 is divisible by 2 and 3, so it is also divisible by 6.
Difference between the sums obtained by adding alternate digits of the number = (1 + 8) – (9 + 0) = 9 – 9 = 0.
Thus according to the test for divisibility by 11, 1980 is divisible by 11.
∴ 1980 is divisible by 2, 3, 4, 5, 6, 9, 10 and 11.

Exercise-2

Solution 1:

1. 6
   Using the tests of divisibility, we can say that 2 and 3 are divisors of 6. Also, 1 and 6 are divisors of 6.∴ 1, 2, 3 and 6 are the divisors of 6.
2. 15
   Using the tests of divisibility, we can say that 3 and 5 are divisors of 15. Also, 1 and 15 are divisors of 15.∴ 1, 3, 5 and 15 are the divisors of 15.
3. 18
   Using the tests of divisibility, we can say that 2, 3, 6 and 9 are divisors of 18. Also, 1 and 18 are divisors of 18.∴1, 2, 3, 6, 9 and 18 are the divisors of 18.
4. 23
   23 has only two divisors 1 and 23.
   ∴ 1 and 23 are the divisors of 23.
5. 28
   Using the tests of divisibility, we can say that 2 and 4 are divisors of 28.28 ÷ 2 = 14 and 28 ÷ 4 = 7
   So, 14 and 7 are also divisors of 28. Also, 1 and 18 are divisors of 18.
   ∴ 1, 2, 4, 7, 14 and 28 are the divisors of 28.
6. 45
   Using the tests of divisibility, we can say that 3 and 5 are divisors of 45.45 ÷ 3 = 15 and 45 ÷ 5 = 9. So, 15 and 9 are also divisors of 28. Also, 1 and 45 are divisors of 45.
   ∴ 1, 3, 5, 9, 15 and 45 are the divisors of 45.

7. 71
   71 has only two divisors, 1 and 71.∴1 and 71 are the divisors of 71.
8. 85
   Using the tests of divisibility, we can say that 5 is a divisor of 85.85 ÷ 5 = 17. So, 17 is a divisor of 85. Also, 1 and 85 are divisors of 85.∴1, 5, 17 and 85 are the divisors of 85.
9. 100
   Using the tests of divisibility, we can say that 2, 4, 5 and 10 are divisors of 100.100 ÷ 2 = 50, 100 ÷ 4 = 25, 100 ÷ 5 = 20. So, 20, 25 and 50 are also divisors of 100. Also, 1 and 100 are divisors of 100.
   ∴ 1, 2, 4, 5, 10, 20, 25, 50 and 100 are the divisors of 100.
10. 91
    91 is divisible by 7.
    91 ÷ 7 = 13. So, 7 and 13 are the divisors of 91. Also, 1 and 91 are the divisors of 91.
    ∴ 1, 7, 13 and 91 are the divisors of 91.

Exercise-3

Solution 1:
The number 1 is neither a prime nor a composite number.

Solution 2:
2 is the only prime number which is even.

Solution 3:
The prime numbers between 1 and 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97.
Thus there are 25 prime numbers between 1 and 100.

Solution 4:

1. 93
   93 is divisible by 3. So, 93 has more than two divisors. (1 and the number itself are always the divisors of that number.)
   ∴ 93 is a composite number.
2. 97
   97 does not have any other divisor except 1 and 97
   ∴ 97 is a prime number.
3. 101
   101 does not have any other divisor except 1 and 101.
   ∴ 101 is a prime number.

4. 117
   117 is divisible by 3 and 9. Hence, 117 has more than two divisors.
   ∴ 117 is a composite number.
5. 127
   127 does not have any other divisor except 1 and 127.
   ∴ 127 is a prime number.
6. 295
   295 is divisible by 5. Hence, 295 has more than two divisors.
   ∴ 295 is a composite number.
7. 407
   407 is divisible by 11. Hence, 407 has more than two divisors.
   ∴ 407 is a composite number.
8. 499
   499 does not have any other divisor except 1 and 499
   499 is a prime number.
9. 527
   527 is divisible by 17. So, 527 has more than two divisors.
   ∴ 527 is a composite number.
10. 637
    637 is divisible by 7. So, 637 has more than two divisors.
    ∴ 637 is a composite number.
11. 689
    689 is divisible by 13. So, 689 has more than two divisors.
    ∴ 689 is a composite number.
12. 209
    209 is divisible by 11 and 19. So, 209 has more than two divisors.
    ∴ 209 is a composite number
13. 901
    901 is divisible by 17. So, 901 has more than two divisors.
    ∴ 901 is a composite number.
14. 953
    953 does not have any other divisor except 1 and 953.
    ∴ 953 is a prime number.
15. 997
    997 does not have any other divisor except 1 and 997.
    ∴ 997 is a prime number.

Solution 5:

Prime numbers from 101 to 201 are 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, and 199.

Solution 6:

21 = 7 × 3, hence a number will be divisible by 21 only if it is divisible by both 7 and 3. But 507 is not divisible by 7. Hence, 507 is not divisible by 21.

Solution 7:
The smallest 3-digit number is 100 but it is not a prime number.
The smallest 3-digit prime number is 101.
The biggest 3-digit number is 999.
999 is divisible by 3, hence it is not a prime number.
Consider the number 997, it is only divisible only by 1 and 997. Hence, 997 is a prime number.
∴ The smallest 3-digit prime number = 101
The biggest 3-digit prime number = 997

Exercise-4

Solution 1:
The twin prime pairs from 1 to 100 are:

1. 3, 5
2. 5, 7
3. 11, 13
4. 17, 19
5. 29, 31
6. 41, 43
7. 59, 61
8. 71, 73

Solution 2:
Remember : Co-prime numbers have only 1 as their common divisor

1. 3 is a common divisor of 9 and 12.
   ∴ 9, 12 do not form a pair of coprime numbers.
2. 27 and 35 have no common divisor except 1.
   ∴ 27, 35 form a pair of coprime numbers.
3. 4 and 5 are consecutive numbers.
   ∴ 4, 5 form a pair of coprime numbers.
4. 3 is a common divisor of 3 and 102.
   ∴ 3, 102 do not form a pair of coprime numbers.
5. 3 and 9 are common divisors of 207 and 702.
   ∴ 207, 702 do not form a pair of coprime numbers.
6. 17 and 19 are twin primes.
   ∴ 17, 19 form a pair of coprime numbers.
7. 11 is the common divisor of 11 and 55.
   ∴ 11, 55 do not form a pair of coprime numbers.
8. 21 and 16 have no common divisor except 1.
   ∴ 21, 16 form a pair of coprime numbers.
9. 17 is the common divisor of 85 and 51.
   ∴ 85, 51 do not form a pair of coprime numbers.

10. 13 is a common divisor of 52 and 143.
∴ 52, 143 do not form a pair of coprime numbers.

Exercise-5

Solution 1(1):

Method 1:

$120 = 2 \times 60$
$= 2 \times 2 \times 30$
$= 2 \times 2 \times 2 \times 15$
$= 2 \times 2 \times 2 \times 3 \times 5$

Method 2 :

2	120
2	60
2	30
3	15
5	5
	1

$\therefore 120 = 2 \times 2 \times 2 \times 3 \times 5$

Solution 1(2):

$324 = 2 \times 162$
$= 2 \times 2 \times 81$
$= 2 \times 2 \times 3 \times 27$
$= 2 \times 2 \times 3 \times 3 \times 9$
$= 2 \times 2 \times 3 \times 3 \times 3 \times 3$

$\therefore 324 = 2 \times 2 \times 3 \times 3 \times 3 \times 3$

Solution 1(3):

$176 = 2 \times 88$
$= 2 \times 2 \times 44$
$= 2 \times 2 \times 2 \times 22$
$= 2 \times 2 \times 2 \times 2 \times 11$

$\therefore 176 = 2 \times 2 \times 2 \times 2 \times 11$

Solution 1(4):

$$420 = 2 \times 210$$
$$= 2 \times 2 \times 105$$
$$= 2 \times 2 \times 3 \times 35$$
$$= 2 \times 2 \times 3 \times 5 \times 7$$

$$\therefore 420 = 2 \times 2 \times 3 \times 5 \times 7$$

Solution 1(5):

$$925 = 5 \times 185$$
$$= 5 \times 5 \times 37$$

$$\therefore 925 = 5 \times 5 \times 37$$

Solution 1(6):

$$715 = 5 \times 143$$
$$= 5 \times 11 \times 13$$

$$\therefore 715 = 5 \times 11 \times 13$$

Solution 1(7):

$$6426 = 2 \times 3213$$
$$= 2 \times 3 \times 1071$$
$$= 2 \times 3 \times 3 \times 357$$
$$= 2 \times 3 \times 3 \times 3 \times 7 \times 17$$

$$\therefore 6426 = 2 \times 3 \times 3 \times 3 \times 7 \times 17$$

Solution 1(8):

$$8569 = 11 \times 779$$
$$= 11 \times 19 \times 41$$

$$\therefore 8569 = 11 \times 19 \times 41$$

Exercise-6

Solution 1(1):

Divisors of 6: 1, 2, 3, 6
Divisors of 8: 1, 2, 4, 8
Of the common divisors 1 and 2, the biggest divisor is 2.
∴ GCD of 6 and 8 is 2.

Solution 1(2):
Divisors of 9: 1, 3, 9
Divisors of 12: 1, 2, 3, 4, 6, 12
Of the common divisors 1 and 3, the biggest divisor is 3.
∴ GCD of 9 and 12 is 3.

Solution 1(3):
Divisors of 6: 1, 2, 3, 6
Divisors of 12: 1, 2, 3, 4, 6, 12
Divisors of 18: 1, 2, 3, 6, 9, 18
Of the common divisors 1, 2, 3 and 6, the biggest divisor is 6.
∴ GCD of 6, 12 and 18 is 6.

Solution 1(4):
Divisors of 30: 1, 2, 3, 5, 6, 10, 15, 30
Divisors of 45: 1, 3, 5, 9, 15, 45
Of the common divisors 1, 3, 5 and 15, the biggest divisor is 15.
∴ GCD of 30 and 45 is 15.

Solution 1(5):
Divisors of 30: 1, 2, 3, 5, 6, 10, 15, 30
Divisors of 20: 1, 2, 4, 5, 10, 20
Of the common divisors 1, 2, 5 and 10, the biggest divisor is 10.
∴ GCD of 30 and 20 is 10.

Solution 1(6):
Divisors of 42: 1, 2, 3, 6, 7, 14, 21, 42
Divisors of 28: 1, 2, 4, 7, 14, 28
Divisors of 70: 1, 2, 5, 7, 10, 14, 35, 70
Of the common divisors 1, 2, 7 and 14, the biggest divisor is 14.
∴ GCD of 42, 28 and 70 is 14.

Solution 1(7):
Divisors of 60: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
Divisors of 90: 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 45, 90
Of the common divisors 1, 2, 3, 5, 6, 10, 15 and 30, the biggest divisor is 30.
∴ GCD of 60 and 90 is 30.

Solution 1(8):
Divisors of 120: 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 24, 30, 40, 60, 120
Divisors of 96: 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96
Of the common divisors 1, 2, 3, 4, 6, 8, 12 and 24, the biggest divisor is 24.
∴GCD of 120 and 96 is 24.

Exercise-7

Solution 1(1):
90 = 2 × 45 = 2 × 9 × 5 = 2 × 3 × 3 × 5
50 = 2 × 25 = 2 × 5 × 5
The numbers 2 × 5 are the greatest common divisors of 90 and 50.
∴ GCD of 90 and 50 = 2 × 5 = 10

Solution 1(2):
42 = 2 × 21 = 2 × 3 × 7
70 = 2 × 35 = 2 × 5 × 7
The numbers 2 × 7 are the greatest common divisors of 42 and 70.
∴ GCD of 42 and 70 = 2 × 7 = 14

Solution 1(3):
75 = 3 × 25 = 3 × 5 × 5
45 = 9 × 5 = 3 × 3 × 5
60 = 2 × 30 = 2 × 2 × 15 = 2 × 2 × 3 × 5
The numbers 3 × 5 are the greatest common divisors of 75, 45 and 60.
∴ GCD of 75, 45 and 60 = 3 × 5 = 15

Solution 1(4):
144 = 16 × 9 = 2 × 2 × 2 × 2 × 3 × 3
216 = 8 × 27 = 2 × 2 × 2 × 3 × 3 × 3
The numbers 2 × 2 × 2 × 3 × 3 are the greatest common divisors of 144 and 216.
∴ GCD of 144 and 216 = 2 × 2 × 2 × 3 × 3 = 72

Solution 1(5):
406 = 2 × 203 = 2 × 7 × 29
870 = 10 × 87 =2 × 5 × 3 × 29
The numbers 2 × 29 are the greatest common divisors of 406 and 870.
∴ GCD of 406 and 870 = 2 × 29 = 58

Solution 1(6):
100 = 10 × 10 = 2 × 5 × 2 × 5 = 2 × 2 × 5 × 5
125 = 5 × 25 = 5 × 5 × 5
150 = 6 × 25 = 2 × 3 × 5 × 5
The numbers 5 × 5 are the greatest common divisors of 100, 125 and 150.
∴ GCD of 100, 125 and 150 = 5 × 5 = 25

Solution 1(7):
75 = 3 × 25 = 3 × 5 × 5
57 = 3 × 19

102 = 6 × 17 = 2 × 3 × 17
The number 3 is the greatest common divisors of 75, 57 and 102.
∴ GCD of 75, 57 and 102 = 3

Solution 1(8):
105 = 21 × 5 = 3 × 7 × 5 = = 3 × 5 × 7
154 = 22 × 7 = 2 × 11 × 7 = = 2 × 7 × 11
The number 7 is the greatest common divisors of 105 and 154.
∴ GCD of 105 and 154 = 7

Solution 1(9):
56 and 57 are consecutive numbers. Hence, they are coprime numbers. GCD of co-prime numbers is 1.
∴ GCD of 56 and 57 = 1

Solution 1(10):
777 = 7 × 111 = 7 × 3 × 37 = 3 × 7 × 37
315 = 9 × 35 = 3 × 3 × 5 × 7
588 = 4 × 147 = 2 × 2 × 3 × 49 = 2 × 2 × 3 × 7 × 7
The numbers 3 × 7 are the greatest common divisors of 777, 315 and 588.
∴ GCD of 777, 315 and 588 = 3 × 7 = 21

Solution 1(11):
585 = 9 × 65 = 3 × 3 × 5 × 13
675 = 27 × 25 = 3 × 3 × 3 × 5 × 5
540 = 4 × 135 = 2 × 2 × 9 × 15 = 2 × 2 × 3 × 3 × 3 × 5
The numbers 3 × 5 × 5 are the greatest common divisors of 585, 675 and 540.
∴ GCD of 585, 675 and 540 = 3 × 3 × 5 = 45

Solution 1(12):
45 = 9 × 5 = 3 × 3 × 5
42 = 6 × 7 = 2 × 3 ×7
88 = 8 × 11 = 2 × 2 × 2 × 11
The given number does not have any common divisors. But 1 is a divisor of every number.
∴ GCD of 45, 42 and 88 = 1

Solution 2:

1. 12, 24
   24 is a multiple of 12 (24 = 12 × 2).
   ∴ GCD of 12 and 24 = 12

2. 30, 15
   30 is a multiple of 15 (30 = 15 × 2).
   ∴ GCD of 30 and 15 = 15
3. 9, 27, 63
   27 and 63 are multiples of 9 (27 = 9 × 3, 63 = 9 ×7).
   ∴ GCD of 9, 27 and 63 = 9
4. 23, 69
   69 is a multiple of 23 (69 = 23 × 3).
   ∴ GCD of 23 and 69 = 23
5. 11, 33, 44
   33 and 44 are multiples of 11 (33 = 11 × 3, 44 = 11 × 4).
   ∴ GCD of 11, 33 and 44 = 11
6. 18, 144
   144 is a multiple of 18 (144 = 18 × 8).
   ∴ GCD of 18 and 144 = 18

Exercise-8

Solution 1(1):
Multiples of 4 = 4, 8, 12, 16, 20, 24, 28, 32, 36…
Multiples of 6 = 6, 12, 18, 24, 30, 36…
Common multiples of 4 and 6: 12, 24, 36…
The smallest multiple of these numbers is 12.
∴ LCM of 4 and 6 = 12

Solution 1(2):
Multiples of 15 = 15, 30, 45, 60, 75, 90…
Multiples of 10 = 10, 20, 30, 40, 50, 60…
Common multiples of 15 and 10: 30, 60, 90…
The smallest multiple of these numbers is 30.
∴ LCM of 15 and 10 = 30

Solution 1(3):
Multiples of 4 =4, 8, 12, 16, 20, 24, 28, 32, 36…
Multiples of 6 = 6, 12, 18, 24, 30, 36, 42, 46…
Multiples of 8 = 8, 16, 24, 32, 40, 48, 56, 64…
Common multiples of 4, 6 and 8: 24, 48…
The smallest multiple of these numbers is 24.
∴ LCM of 4, 6 and 8 = 24

Solution 1(4):
Multiples of 12 = 12, 24, 36, 48, 60, 72…
Multiples of 9 = 9, 18, 27, 36, 45, 54, 63, 72…
Common multiples of 12 and 9: 36, 72…

The smallest multiple of these numbers is 36.
∴ LCM of 12 and 9 = 36

Solution 1(5):
Multiples of 2 = 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28…
Multiples of 4 = 4, 8, 12, 16, 20, 24, 28, 32, 36…
Multiples of 7 = 7, 14, 21, 28, 35, 42, 49…
Common multiples of 2, 4 and 7: 28..
The smallest of these numbers is 28.
∴ LCM of 2, 4 and 7 = 28

Solution 1(6):
Multiples of 65 = 65, 130, 195, 260, 325, 390…
Multiples of 39 = 39, 78, 117, 156, 195, 234, 273, 312, 351, 390…
Common multiples of 65 and 39: 195, 390..
The smallest of these numbers is 195.
∴ LCM of 65 and 39 = 195

Solution 2(1):
LCM of the relative prime numbers is their product.
∴ LCM of 9 and 7 = 9 × 7 = 63

Solution 2(2):
LCM of the relative prime numbers is the product of those numbers.
∴ LCM of 4 and 11 = 4 × 11 = 44

Solution 2(3):
LCM of the relative prime numbers is the product of those numbers.
∴ LCM of 15 and 14 = 15 × 14 = 210.

Solution 3(1):
If one number is a multiple of the other number, then the bigger number is the LCM of the two numbers.
30 is a multiple of 15.
∴ LCM of 15 and 30 = 30

Solution 3(2):
48 is a multiple of 16.
∴ LCM of 48 and 16 = 48

Solution 3(3):
102 is a multiple of 34.
∴ LCM of 34 and 102 = 102

Exercise-9

Solution 1(1):
6 = 2 × 3 and
8 = 2 × 2 × 2
The common prime factor of 6 and 8: 2
The prime factors not common to 6 and 8: 2, 2, 3
The product of common and non-common prime factors of 6 and 8 = 2 × 2 × 2 × 3 = 24
∴ LCM of 6 and 8 = 24

Solution 1(2):
6 = 2 × 3 and
8 = 2 × 2 × 2
10 = 2 × 5
The common prime factor of 6, 8 and 10 : 2
Apart from these,
The prime factors common to 6 and 8 : none
The prime factors common to 8 and 10 : none
The prime factors common to 6 and 10 : none
The prime factors left over = 2, 2, 3, 5
∴ LCM of 6, 8 and 10 = (2) × (2 × 2 × 3 × 5) = 2 × 60 = 120

Solution 1(3):
15 = 3 × 5 and
20 = 2 × 2 × 5
The common prime factor of 15 and 20: 5
The prime factors not common to 6 and 8: 2, 2, 3
The product of common and non-common prime factors of 6 and 8 = 5 × 2 × 2 × 3 = 60
∴ LCM of 15 and 20 = 60

Solution 1(4):
9 = 3 × 3
15 = 3 × 5
20 = 2 × 2 × 5
The common prime factor of 9, 15 and 20: none
Apart from these,
The prime factors common to 9 and 15: 3
The prime factors common to 15 and 20: 5The prime factors common to 9 and 20: none
The prime factors left over = 2, 2, 3
∴ LCM of 9, 15 and 20 = (3 × 5) × (2 × 2 × 3) = 15 × 12 = 180

Solution 1(5):
45 = 3 × 3 × 5
36 = 2 × 2 × 3 × 3
The common prime factor of 45 and 36: 3, 3

The prime factors not common to 45 and 36: 2, 2, 5
The product of common and non-common prime factors of 45 and 36 = 3 × 3 × 5 × 2 × 2 = 180
∴ LCM of 45 and 36 = 180

Solution 1(6):
45 = 3 × 3 × 5
36 = 2 × 2 × 3 × 3
30 = 2 × 3 × 5
The common prime factor of 45, 36 and 30 : 3
Apart from these,
The prime factors common to 45 and 36: 3
The prime factors common to 36 and 30: 2
The prime factors common to 45 and 30: 5
The prime factors left over = 2
∴ LCM of 45, 36 and 30 = (3) × (3 × 2 × 5 × 2) = 3 × 60 = 180

Solution 1(7):
65 = 5 × 13
39 = 3 × 13
The common prime factor of 65 and 39: 13
The prime factors not common to 65 and 39: 3, 5
The product of common and non-common prime factors of 45 and 36 = 13 × 3 × 5 = 195
∴ LCM of 65 and 39 = 195

Solution 1(8):
28 = 2 × 2 × 7
72 = 2 × 2 × 2 × 3 × 3
98 = 2 × 7 × 7
The common prime factor of 28, 72 and 98: 2
Apart from these,
The prime factors common to 28 and 72: 2
The prime factors common to 72 and 98: none
The prime factors common to 28 and 98: 7
The prime factors left over = 2, 3, 3, 7
∴ LCM of 28, 72 and 98 = (2 × 2 × 7) × (2 × 3 × 3 × 7) = 28 × 126 = 2538

Solution 1(9):
105 = 3 × 5 × 7
195 = 3 × 5 × 13
The common prime factor of 105 and 195: 3, 5
The prime factors not common to 105 and 195: 7, 13
The product of common and non-common prime factors of 105 and 195 = 3 × 5 × 7 × 13 = 1365
∴ LCM of 105 and 195 = 1365

Solution 1(10):
165 = 3 × 5 × 11
90 = 2 × 3 × 3 × 5
The common prime factor of 165 and 90: 3, 5
The prime factors not common to 105 and 195: 11, 2, 3
The product of common and non-common prime factors of 165 and 90 = 3 × 5 × 11 × 2 × 3 = 990
∴ LCM of 165 and 90 = 990

Solution 1(11):
120 = 2 × 2 × 2 × 3 × 5
90 = 2 × 3 × 3 × 5
175 = 5 × 5 × 7
The common prime factor of 120, 90 and 175: 5
Apart from these,
The prime factors common to 120 and 90: 2, 3
The prime factors common to 90 and 175: none
The prime factors common to 120 and 175: none
The prime factors left over = 2, 2, 3, 5, 7
∴ LCM of 120, 90 and 175 = (5 × 2 × 3) × (2 × 2 × 3 × 5 × 7) = 30 × 420 = 12600

Solution 1(12):
216 = 2 × 2 × 2 × 3 × 3 × 3
288 = 2 × 2 × 2 × 2 × 2 × 3 × 3
270 = 2 × 3 × 3 × 3 × 5
The common prime factor of 216, 288 and 270: 2, 3, 3
Apart from these,
The prime factors common to 216 and 288: 2, 2
The prime factors common to 288 and 270: none
The prime factors common to 120 and 175: 3
The prime factors left over = 2, 2, 5
∴ LCM of 216, 288 and 270 = (2 × 3 × 3 × 2 × 2 × 3) × (2 × 2 × 5) = 216 × 20 = 4320

Solution 2(1):
250 = 2 × 5 × 5 × 5
150 = 2 × 3 ×5 × 5
The common prime factor of 250 and 150: 2, 5, 5
The prime factors not common to 250 and 150: 5, 3
The GCD of 250 and 150 = 2 × 5 × 5 = 50
∴ LCM of 250 and 150 = (2 × 5 × 5) × (5 × 3) = 750

Solution 2(2):
96 = 2 × 2 × 2 × 2 × 2 × 3
192 = 2 × 2 × 2 × 2 × 2 × 2 × 3
The common prime factor of 96 and 192: 2, 2, 2, 2, 2, 3

The prime factors not common to 96 and 192: 2
The GCD of 96 and 192 = 2 × 2 × 2 × 2 × 2 × 3 = 96
∴ LCM of 96 and 192 = (2 × 2 × 2 × 2 × 2 × 3) × (2) = 192

Solution 2(3):
32 and 37 are co-prime numbers.
∴ GCD = 1
LCM is the product of these numbers.
∴ LCM = 32 × 37 = 1184

Solution 2(4):
132 = 2 × 2 × 3 × 11
88 = 2 × 2 × 2 × 11
The common prime factor of 132 and 88: 2, 2, 11
The prime factors not common to 132 and 88: 2, 3
The GCD of 132 and 88 = 2 × 2 × 11 = 44
∴ LCM of 132 and 88 = (2 × 2 × 11) × (3 × 2) = 44 × 6 = 264

Solution 2(5):
405 = 3 × 3 × 3 × 3 × 5
225 = 3 × 3 × 5 × 5
The common prime factor of 405 and 225: 3, 3, 5
The prime factors not common to 405 and 225: 3, 3, 5
The GCD of 405 and 225 = 3 × 3 × 5 = 45
∴ LCM of 405 and 225 = (3 × 3 × 5) × (3 × 3 × 5) = 45 × 45 = 2025

Solution 2(6):
46 = 2 × 23
51 = 3 × 17
35 = 5 × 7
The common prime factors of 46, 51 and 35: none
The common prime factors of 46 and 51: none
The common prime factors of 51 and 35: none
The common prime factors of 46 and 35: none
46, 51, 35 do not have any common prime factor.
∴ GCD of 46, 51, 35 = 1
LCM is equal to their product
∴ LCM = 46 × 51 × 35 = 82110