Chapter 3 : Playing with Numbers

ANSWER KEYS

EXERCISE 3.1

1. Since, the odd numbers end in 1, 3, 5, 7, 9.

So (*ii*), (*iii*), (*v*) are odd numbers.

2. (*i*) Multiples of 13 (between 26 and 117) are

$13 \times 3 = 39$, $13 \times 4 = 52$, $13 \times 5 = 65$,

$13 \times 6 = 78$, $13 \times 7 = 91$, $13 \times 8 = 104$

(*ii*) Multiples of 17 (between 57 and 136) are

$17 \times 4 = 68$, $17 \times 5 = 85$, $17 \times 6 = 102$,

$17 \times 7 = 119$, $17 \times 8 = 136$

3. We have to find the numbers between 20 and 35 whose only factors are 1 and the number itself. Such numbers are 23, 29, 31.

4. (*i*) **13, 65**

$$13\overline{)65}\,(5$$
$$-65$$
$$0$$

Yes, 13 is a factor of 65.

(*ii*) **15, 60**

$$15\overline{)60}\,(4$$
$$-60$$
$$0$$

Yes, 15 is a factor of 60.

(*iii*) **17, 64**

$$17\overline{)64}\,(3$$
$$-51$$
$$13$$

$\because$ 64 is not exactly divisible by 17.

$\therefore$ 17 is not a factor of 64.

(*iv*) **8, 72**

$$8\overline{)72}\,(9$$
$$-72$$
$$0$$

Yes, 8 is a factor of 72.

5. (*i*) $5 = 3 + 2$

(*ii*) $12 = 5 + 7$

(*iii*) $36 = 7 + 29$ or $13 + 23$ or $17 + 19$

6. (*i*) The given number is 45.

Since, 1 is a factor of every number and every number is a factor of itself. Therefore, 1 and 45 are its factors.

If we divide 45 by 3, the quotient is 15 and remainder is zero. Therefore, 3 and 15 are its factors.

If we divide 45 by 5, the quotient is 9 and remainder is zero. Therefore, 5 and 9 are its factor.

Listing all factors of 45, we get 1, 3, 5, 9, 15, 45.

(*ii*) The given number is 60.

Clearly, 1 and 60 are the factors of 60.

60 is also exactly divisible by 2, 3, 4, 5, 6, 10, 12, 15, 20 and 30.

Listing all factors of 60, we get

1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 and 60.

(*iii*) The given number is 78.

Clearly, 1 and 78 are the factors of 78.

78 is also divisible by 2, 3, 6, 13, 26 and 39.

Listing all factors of 78, we get

1, 2, 3, 6, 13, 26, 39 and 78.

7. Even numbers between 31 and 51 are 32, 34, 36, 38, 40, 42, 44, 46, 48 and 50.

8. $9 \times 1 = 9$, $9 \times 2 = 18$, $9 \times 3 = 27$, $9 \times 4 = 36$,

$9 \times 5 = 45$, $9 \times 6 = 54$, $9 \times 7 = 63$ $9 \times 8 = 72$,

$9 \times 9 = 81$, $9 \times 10 = 90$ $9 \times 11 = 99$

Hence, the multiples of 9 upto 100 are 9, 18, 27, 36, 45, 54, 63, 72, 81, 90 and 99.

9. **Even number :** Even numbers end in 0, 2, 4, 6, 8. Therefore (*i*) 250, (*ii*) 4682 are even numbers.

Odd number : Odd numbers end in 1, 3, 5, 7, 9. Therefore, (*iii*) 357, (*iv*) 3295, (*v*) 1283, (*vi*) 119 are odd numbers.

10. (*i*) $21 = 3 + 5 + 13$ or $3 + 7 + 11$

(*ii*) $31 = 5 + 7 + 19$ or $3 + 11 + 17$ or $7 + 11 + 13$

(*iii*) $53 = 5 + 7 + 41$ or $3 + 7 + 43$ or $5 + 17 + 31$

11. (*i*) $44 = 13 + 31$ or $7 + 37$ or $41 + 3$

(*ii*) $18 = 5 + 13$ or $7 + 11$

(*iii*) $24 = 5 + 19$ or $7 + 17$ or $11 + 13$

12. These are pairs of prime numbers which follow each other and differ by 2. Three examples of twin-primes are (3, 5), (5, 7) and (11, 13).

EXERCISE 3.2

1. If the given number between 100 and 400 is divisible by any prime number less than 20 *i.e.*, 2, 3, 5, 7, 11, 13, 17 and 19, then it is not a prime, otherwise it is prime.

The largest prime number as a divisor to test 397 a prime number is 19.

Also, 397 is not exactly divisible by 19.

So, 397 is a prime number.

2. A number is divisible by 2, if its ones digit is 0, 2, 4, 6 or 8.

(*i*) 367146 is divisible by 2 as its ones digit is 6.

(*ii*) 42990 is divisible by 2 as its ones digit is 0.

(*iii*) 567298 is divisible by 2 as its ones digit is 8.

(*iv*) 34503 is not divisible by 2 as its ones digit is 3.

(*v*) 29601 is not divisible by 2 as its ones digit is 1.

(*vi*) 12964 is divisible by 2 as its ones digit is 4.

Hence, (*i*), (*ii*), (*iii*) and (*vi*) are divisible by 2.

3. A number is divisible by 3, if the sum of its digits is exactly divisible by 3.

(*i*) Since, the sum of digits of 73101 *i.e.*, 7 + 3 + 1 + 0 + 1 = 12 is divisible by 3, hence, 73101 is also divisible by 3.

(*ii*) Since, the sum of digits 16422 *i.e.*, 1 + 6 + 4 + 2 + 2 = 15 is divisible by 3, hence, 16422 is also divisible by 3.

(*iii*) Since, the sum of digits of 74912 *i.e.*, 7 + 4 + 9 + 1 + 2 = 23 is not divisible by 3, hence, 74912 is also not divisible by 3.

(*iv*) Since, the sum of digits of 70201 *i.e.*, 7 + 0 + 2 + 0 + 1 = 10 is not divisible by 3, hence 70201 is also not divisible by 3.

(*v*) Since, the sum of digits of 493605 *i.e.*, 4 + 9 + 3 + 6 + 0 + 5 = 27 is divisible by 3, hence, 493605 is also divisible by 3.

(*vi*) Since, the sum of digits of 82568 *i.e.*, 8 + 2 + 5 + 6 + 8 = 29 is not divisible by 3, hence 82568 is also not divisible by 3.

So, (*i*), (*ii*) and (*v*) are divisible by 3.

4. (*i*) The given number is 75642. Since, last digit 2 of the given number is even, hence, the number is divisible by 2.

Also, sum of digits of number 75642 *i.e.*, 7 + 5 + 6 + 4 + 2 = 24 is divisible by 3.

Thus, the number is divisible by 3.

As 75642 is divisible by both 2 and 3. So 75642 is also divisible by 6.

(*ii*) The given number is 65472.

Since, last digit 2 of the given number is even, hence the number is divisible by 2.

Also, the sum of digits of number 65472 *i.e.*,

6 + 5 + 4 + 7 + 2 = 24 is divisible by 3.

Hence, the number is divisible by 3.

As 65472 is divisible by both 2 and 3. So, 65472 is also divisible by 6.

(*iii*) The given number is 54623.

Since, last digit 3 of the given number is odd, thus, it is not divisible by 2.

As 54623 is not divisible by 2, 54623 is also not divisible by 6.

(*iv*) The given number is 215370.

Since, the number is even, therefore it is divisible by 2.

Also, the sum of digits of 215370 *i.e.*, 2 + 1 + 5 + 3 + 7 + 0 = 18 is divisible by 3, therefore the number is divisible by 3.

As 215370 is divisible by 2 and 3 both. So, it is also divisible by 6.

(*v*) The given number is 29046.

Since, the last digit 6 of number is even.

Thus, it is divisible by 2.

Also, the sum of digits of 29046 *i.e.*, 2 + 9 + 0 + 4 + 6 = 21 is divisible by 3, thus it is divisible by 3.

As 29046 is divisible by 2 and 3 both. So, it is also divisible by 6.

(*vi*) The given number is 809728.

Since, the last digit 8 of number is even. Thus, the given number is divisible by 2.

Also, the sum of digits of number 809728 *i.e.*, 8 + 0 + 9 + 7 + 2 + 8 = 34 is not divisible by 3, thus the given number is not divisible by 3.

As the number 809728 is divisible by 2 but not by 3. So, it is not divisible by 6.

Hence, (*i*), (*ii*), (*iv*), (*v*) are divisible by 6.

5. If the number formed by last two digits of the given number is divisible by 4, then the number is divisible by 4.

(*i*) Since, number formed by last two digits of 918 *i.e.*, 18 is not divisible by 4. Hence, the number 918 is not divisible by 4.

(*ii*) Since, number formed by last two digits of the given number 57312 *i.e.*, 12 is divisible by 4, hence the number 57312 is divisible by 4.

(*iii*) Since, number formed by last two digits of the given number 163976 *i.e.*, 76 is divisible by 4, hence the given number 163976 is divisible by 4.

(*iv*) Since, number formed by last two digits of the given number 397084 *i.e.*, 84 is divisible by 4, hence the given number is divisible by 4.

(*v*) Since, number formed by last two digits of the given number 72138 *i.e.*, 38 is not divisible by 4, hence the given number 72138 is not divisible by 4.

(*vi*) Since, number formed by last two digits of the given number 615024 *i.e.*, 24 is divisible by 4, hence the given number 615024 is divisible by 4.

Hence, (*ii*), (*iii*), (*iv*) and (*vi*) are divisible by 4.

6. If the number formed by last three digits of the given number is divisible by 8, then the number is divisible by 8.

(*i*) Since, number formed by the last three digits of the given number 569288 *i.e.*, 288 is divisible by 8, hence 569288 is divisible by 8.

(*ii*) Since, number formed by the last three digits of the given number 67152 *i.e.*, 152 is divisible by 8, hence 67152 is divisible by 8.

(*iii*) Since, number formed by the last three digits of the given number 59348 *i.e.*, 348 is not divisible by 8, hence 59348 is not divisible by 8.

(*iv*) Since, number formed by the last three digits of the given number 7328 *i.e.*, 328 is divisible by 8, hence 7328 is divisible by 8.

(*v*) Since, number formed by the last three digits of the given number 965214 *i.e.*, 214 is not divisible by 8, hence 965214 is not divisible by 8.

(*vi*) Since, number formed by the last three digits of the given number 827432 *i.e.*, 432 is divisible by 8, hence 827432 is divisible by 8.

Hence, (*i*), (*ii*), (*iv*) and (*vi*) are divisible by 8.

7. If the last digits (ones digit) of the given number is 0 or 5, then the given number is divisible by 5 and if the ones digit is only 0, then the number is divisible by 10.

(*i*) 3345 is divisible by 5 as its ones digit is 5.

(*ii*) 2968 is not divisible by 5 and 10 as its ones digit is 8.

(*iii*) 56780 is divisible by 5 and 10 both as its ones digit is 0.

(*iv*) 72385 is divisible by 5 as its ones digit is 5.

(*v*) 92965 is divisible by 5 as its ones digit is 5.

(*vi*) 206174 is not divisible by 5 and 10 as its ones digit is 4.

Hence, (*i*), (*iii*), (*iv*) and (*v*) are divisible by 5 and (*iii*) is divisible by 5 and 10 both.

8. A number is divisible by 7, if the difference between twice the last digit and the rest of digits of the number is either 0 or a multiple of 7.

(*i*) In the given number 7854, the last digit is 4.

As 785 – (2 × 4) = 777 is a multiple of 7, hence 7854 is divisible by 7.

(*ii*) In the given number 10822, the last digit is 2.

As 1082 – (2 × 2) = 1078 is a multiple of 7, hence 10822 is divisible by 7.

(*iii*) In the given number 32968, the last digit is 8.

As 3296 – (2 × 8) = 3280 is not a multiple of 7, hence 32968 is not divisible by 7.

(*iv*) In the given number 22862, the last digit is 2.

As 2286 – (2 × 2) = 2282 is a multiple of 7, hence 22862 is divisible by 7.

(*v*) In the given number 22253, the last digit is 3.

As 2225 – (2 × 3) = 2219 is a multiple of 7, hence 22253 is divisible by 7.

(*vi*) In the given number 6275, the last digit is 5.

As 627 – (2 × 5) = 617 is not a multiple of 7, hence 6275 is not divisible by 7.

Hence, (*i*), (*ii*), (*iv*) and (*v*) are divisible by 7.

9. A number is divisible by 11, if the difference between the sum of digits in odd places and the sum of the digits in even places is either 0 or a multiple of 11.

(*i*) The given number is 61809.

Sum of digits in odd places = 9 + 8 + 6 = 23

Sum of digits in even places = 0 + 1 = 1

Difference of two sums = 23 – 1 = 22, which is a multiple of 11.

Hence, 61809 is divisible by 11.

(*ii*) The given number is 38016.

Sum of digits in odd places = 6 + 0 + 3 = 9

Sum of digits in even places = 1 + 8 = 9

Difference of two sums = 9 – 9 = 0

Hence, 38016 is divisible by 11.

(*iii*) The given number is 746928.

Sum of digits in odd places = 8 + 9 + 4 = 21

Sum of digits in even places = 2 + 6 + 7 = 15

Difference of two sums = 21 – 15 = 6,

which is not a multiple of 11.

Hence, 746928 is not divisible by 11.

(*iv*) The given number is 90728.

Sum of digits in odd places = 8 + 7 + 9 = 24

Sum of digits in even places = 2 + 0 = 2

Difference of two sums = 24 – 2 = 22,

which is a multiple of 11.

Hence, 90728 is divisible by 11.

(*v*) The given number is 56248.

Sum of digits in odd places = 8 + 2 + 5 = 15

Sum of digits in even places = 4 + 6 = 10

Difference of two sums = 15 – 10 = 5,

which is not a multiple of 11.

Hence, 56248 is not divisible by 11.

(*vi*) The given number is 60847.

Sum of digits in odd places = 7 + 8 + 6 = 21

Sum of digits in even places = 4 + 0 = 4

Difference of two sums = 21 – 4 = 17,

which is not a multiple of 11.

Hence, 60847 is not divisible by 11.

So, (*i*), (*ii*) and (*iv*) are divisible by 11.

10. A number is divisible by 9, if the sum of digits is divisible by 9.

(*i*) 56 * 5

For the least value of *, the sum of digits must be least multiple of 9.

Therefore, the least value of * is

[18 – (5 + 6 + 5)] = 2.

Hence, the number is 5625.

(*ii*) 31 * 42

For the least value of *, the sum of digits must be least multiple of 9.

Thus, the least value of * is

[18 – (3 + 1 + 4 + 2)] = 8

Hence, the number is 31842.

(*iii*) 5702 *

For the least value of *, the sum of digits must be least multiple of 9.

Thus, the least value of * is

[18 – (5 + 7 + 0 + 2)] = 4.

Hence, the number is 57024.

(*iv*) 357 * 46

For the least value of *, the sum of digits must be least multiple of 9.

Thus, the least value of * is

[27 – (3 + 5 + 7 + 4 + 6)] = 2.

Hence, the number is 357246.

(*v*) 587 * 1

For the least value of *, the sum of digits must be least multiple of 9.

Thus, the least value of * is

[27 – (5 + 8 + 7 + 1)] = 6.

Hence, the number is 58761.

(*vi*) * 2066

For the least value of *, the sum of digits must be least multiple of 9.

Thus, the least value of * is

[18 – (2 + 0 + 6 + 6)] = 4.

Hence, the number is 42066.

11. A number is divisible by 11, if the difference between the sum of digits in odd places and sum of digits in even places is either 0 or a multiple of 11.

(*i*) 35 * 6

The sum of digits in odd places = 6 + 5 = 11

Therefore, the sum of digits in even places should be 11, so that the difference of two sums is 0.

Therefore, least value of * is (11 – 3) = 8.

Hence, the number is 3586.

(*ii*) 439 * 71

The sum of digits in even places = 7 + 9 + 4 = 20.

For difference of two sums is either 0 or multiple of 11, the sum of digits in odd places should be 9, to make the difference 11. Thus, the least value of * is {9 – (1 + 3)} = 5.

Hence, the number is 439571.

(*iii*) 86 * 72

Sum of the digits in even places = 7 + 6 = 13

Sum of the digits in odd places = 2 + * + 8
= * + 10

To make the difference of two sums 0, the least value of * must be 3.

(*iv*) 1723 * 4

Sum of the digits in odd places = 4 + 3 + 7 = 14

Sum of the digits in even places = * + 2 + 1
= * + 3

To make the difference of two sums 11, the least value of * must be 0.

Hence, the number is 172304.

12. If the given number between 100 and 400 is divisible by any prime number less than 20 *i.e.*, 2, 3, 5, 7, 11, 13, 17 and 19, then it is not prime, otherwise it is prime.

(*i*) 277 is not divisible by any prime number upto 20. So, 277 is a prime number.

(*ii*) 143 is divisible by 11, so it is not a prime number.

(*iii*) 253 is not divisible by any prime number less than 20, so it is a prime number.

(*iv*) 397 is not divisible by any prime number less than 20, so it is a prime number.

(*v*) 331 is not divisible by any prime number less than 20, so it is a prime number.

(*vi*) 167 is not divisible by any prime number less than 20, so it is a prime number.

(*vii*) 203 is divisible by 7, so it is not a prime number.

(*viii*) 161 is divisible by 7, so, it is not a prime number.

Hence, (*i*), (*iii*), (*iv*), (*v*) and (*vi*) are prime numbers.

EXERCISE 3.3

1. (*i*) The factors of 20 are 1, 2, 4, 5, 10, 20.

The factors of 28 are 1, 2, 4, 7, 14, 28.

The factors of 32 are 1, 2, 4, 8, 16, 32.

Hence, the common factors are 1, 2, 4.

(*ii*) The factors of 15 are 1, 3, 5, 15.

The factors of 25 are 1, 5, 25.

The factors of 30 are 1, 2, 3, 5, 6, 10, 15, 30.

Hence, the common factors are 1 and 5.

(*iii*) The factors of 75 are 1, 3, 5, 15, 25, 75.

The factors of 60 are 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60.

The factors of 210 are 1, 2, 3, 5, 7, 10, 14, 15, 21, 30, 42, 70, 105, 210.

Hence, the common factors are 1, 3, 5, 15.

(*iv*) The factors of 42 are 1, 2, 3, 6, 7, 14, 21, 42.

The factors of 63 are 1, 3, 7, 9, 21, 63.

The factors of 105 are 1, 3, 5, 7, 15, 21, 35, 105.

Hence, the common factors are 1, 3, 7, 21.

(*v*) The factors of 12 are 1, 2, 3, 4, 6, 12.

The factors of 18 are 1, 2, 3, 6, 9, 18.

The factors of 24 are 1, 2, 3, 4, 6, 8, 12, 24.

Hence, the common factors are 1, 2, 3, 6.

2. Multiples of 3 are 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, ...

Multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40, ...

Multiples of 6 are 6, 12, 18, 24, 30, 36, 42, ...

30 is the first common multiple.

Second common multiple = 2 × 30 = 60

Third common multiple = 3 × 30 = 90

Hence, the first three common multiples are 30, 60, 90.

3. Multiples of 3 are 3, 6, 9, 12, 15, 18, ...

Multiples of 4 are 4, 8, 12, 16, 20, ...

First common multiple is 12.

The numbers which are common multiples of 3 and 4 and less than 100 are 12, 24, 36, 48, 60, 72, 84 and 96.

4. (*i*)

2	420
2	210
3	105
5	35
7	7
	1

Hence, 420 = 2 × 2 × 3 × 5 × 7

(*ii*)

3	375
5	125
5	25
5	5
	1

Hence, 375 = 3 × 5 × 5 × 5

(*iii*)

3	975
5	325
5	65
13	13
	1

Hence, 975 = 3 × 5 × 5 × 13

(*iv*)

2	840
2	420
2	210
3	105
5	35
7	7
	1

Hence, 840 = 2 × 2 × 2 × 3 × 5 × 7

(*v*)

7	637
7	91
13	13
	1

Hence, 637 = 7 × 7 × 13

(*vi*)

2	1080
2	540
2	270
3	135
3	45
3	15
5	5
	1

Hence, 1080 = 2 × 2 × 2 × 3 × 3 × 3 × 5

(*vii*)

2	2904
2	1452
2	726
3	363
11	121
11	11
	1

Hence, 2904 = 2 × 2 × 2 × 3 × 11 × 11

(*viii*)

2	6000
2	3000
2	1500
2	750
3	375
5	125
5	25
5	5
	1

Hence, 6000 = 2 × 2 × 2 × 2 × 3 × 5 × 5 × 5

(*ix*)

2	1296
2	648
2	324
2	162
3	81
3	27
3	9
3	3
	1

Hence, 1296 = 2 × 2 × 2 × 2 × 3 × 3 × 3 × 3

(*x*)

3	4725
3	1575
3	525
5	175
5	35
7	7
	1

Hence, 4725 = 3 × 3 × 3 × 5 × 5 × 7

(*xi*)

2	8020
2	4010
5	2005
	401

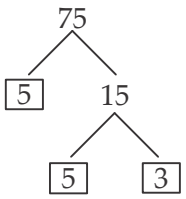
Hence, 8020 = 2 × 2 × 5 × 401

(*xii*)

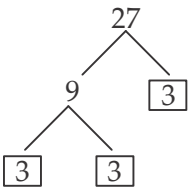
5	7325
5	1465
	293

Hence, 7325 = 5 × 5 × 293

5. (*i*)



(*ii*)



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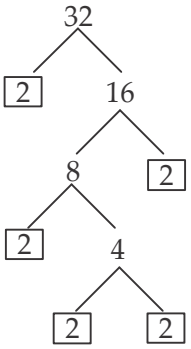
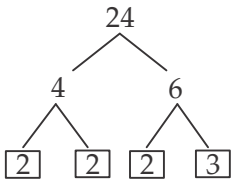


(*iv*)



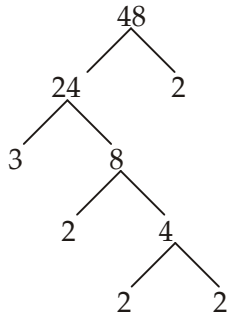
6. (*i*) **48**

48 can be written as 24 × 2.

24 can be written as 3 × 8.

8 can be written as 2 × 4.

Further 4 can be written as 2 × 2. Thus



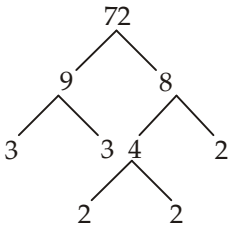
(*ii*) **72**

72 can be written as 9 × 8.

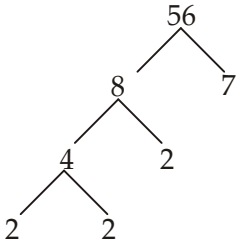
9 can be written as 3 × 3

and 8 can be written as 4 × 2.

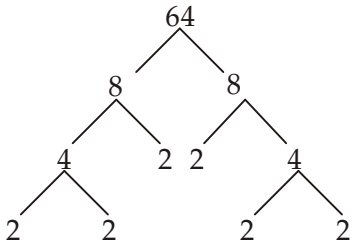
Further, 4 can be written as 2 × 2. Thus



(*iii*)



(*iv*)



EXERCISE 3.4

1.

2	170
5	85
17	17
	1

2	238
7	119
17	17
	1

So, $170 = \boxed{2} \times 5 \times \boxed{17}$

$238 = \boxed{2} \times 7 \times \boxed{17}$

H.C.F. of 170 and 238 is 2 × 17 = 34.

2.

2	272
2	136
2	68
2	34
17	17
	1

5	425
5	85
17	17
	1

So, $272 = 2 \times 2 \times 2 \times 2 \times \boxed{17}$

$425 = 5 \times 5 \times \boxed{17}$

H.C.F. of 272 and 425 is 17.

3.

2	18
3	9
3	3
	1

2	24
2	12
2	6
3	3
	1

2	32
2	16
2	8
2	4
2	2
	1

So, $18 = \boxed{2} \times 3 \times 3$

$24 = \boxed{2} \times 2 \times 2 \times 3$

$32 = \boxed{2} \times 2 \times 2 \times 2 \times 2$

H.C.F. of 18, 24 and 32 is 2.

4.

7	91
13	13
	1

5	175
5	35
7	7
	1

7	49
7	7
	1

So, $91 = \boxed{7} \times 13$

$175 = 5 \times 5 \times \boxed{7}$

$49 = \boxed{7} \times 7$

H.C.F. of 91, 175 and 49 is 7.

5.

2	924
2	462
3	231
7	77
11	11
	1

7	1463
11	209
19	19
	1

5	1925
5	385
7	77
11	11
	1

So, $924 = 2 \times 2 \times 3 \times \boxed{7} \times \boxed{11}$

$1463 = \boxed{7} \times \boxed{11} \times 19$

$1925 = 5 \times 5 \times \boxed{7} \times \boxed{11}$

H.C.F. of 924, 1463 and 1925 is 7 × 11 = 77.

6.

2	150
3	75
5	25
5	5
	1

2	140
2	70
5	35
7	7
	1

2	210
3	105
5	35
7	7
	1

So, $150 = \boxed{2} \times 3 \times \boxed{5} \times 5$

$140 = \boxed{2} \times 2 \times \boxed{5} \times 7$

$210 = \boxed{2} \times 3 \times \boxed{5} \times 7$

Hence, H.C.F. of 150, 140 and 210 is 2 × 5 = 10.

7.

2	396
2	198
3	99
3	33
11	11
	1

2	720
2	360
2	180
2	90
3	45
3	15
5	5
	1

2	1080
2	540
2	270
3	135
3	45
3	15
5	5
	1

So, $396 = \boxed{2} \times \boxed{2} \times \boxed{3} \times \boxed{3} \times 11$

$720 = \boxed{2} \times \boxed{2} \times 2 \times 2 \times \boxed{3} \times \boxed{3} \times 5$

$1080 = \boxed{2} \times \boxed{2} \times 2 \times 3 \times \boxed{3} \times \boxed{3} \times 5$

H.C.F. of 396, 720 and 1080 is $2 \times 2 \times 3 \times 3 = 36$.

8.

2	144
2	72
2	36
2	18
3	9
3	3
	1

2	252
2	126
3	63
3	21
7	7
	1

2	630
3	315
3	105
5	35
7	7
	1

So, $144 = \boxed{2} \times 2 \times 2 \times 2 \times \boxed{3} \times \boxed{3}$

$252 = \boxed{2} \times 2 \times \boxed{3} \times \boxed{3} \times 7$

$630 = \boxed{2} \times \boxed{3} \times \boxed{3} \times 5 \times 7$

H.C.F. of 144, 252 and 630 is $2 \times 3 \times 3 = 18$.

9.

2	1440
2	720
2	360
2	180
2	90
3	45
3	15
5	5
	1

2	1800
2	900
2	450
3	225
3	75
5	25
5	5
	1

2	1920
2	960
2	480
2	240
2	120
2	60
2	30
3	15
5	5
	1

So, $1440 = \boxed{2} \times \boxed{2} \times \boxed{2} \times 2 \times 2 \times \boxed{3} \times 3 \times \boxed{5}$

$1800 = \boxed{2} \times \boxed{2} \times \boxed{2} \times \boxed{3} \times 3 \times \boxed{5} \times 5$

$1920 = \boxed{2} \times \boxed{2} \times \boxed{2} \times 2 \times 2 \times 2 \times 2 \times \boxed{3} \times \boxed{5}$

H.C.F. of 1440, 1800 and 1920 is $2 \times 2 \times 2 \times 3 \times 5 = 120$.

10.

2	72
2	36
2	18
3	9
3	3
	1

2	108
2	54
3	27
3	9
3	3
	1

2	180
2	90
3	45
3	15
5	5
	1

So, $72 = \boxed{2} \times \boxed{2} \times 2 \times \boxed{3} \times \boxed{3}$

$108 = \boxed{2} \times \boxed{2} \times \boxed{3} \times \boxed{3} \times 3$

$180 = \boxed{2} \times \boxed{2} \times \boxed{3} \times \boxed{3} \times 5$

H.C.F. of 72, 108 and 180 is $2 \times 2 \times 3 \times 3 = 36$.

EXERCISE 3.5

1. (*i*) 12, 30

$$\begin{array}{r|l} 12 & 30 \\ -24 & \\ \hline 6 & 12 \\ -12 & \\ \hline 0 & \end{array} \quad 2 \quad 2$$

Two numbers are co-primes, if their H.C.F. is 1.
Here, H.C.F. is 6.

Hence, 12 and 30 are not co-primes.

(*ii*) 8, 21

$$\begin{array}{r|l} 8 & 21 \\ -16 & \\ \hline 5 & 8 \\ -5 & \\ \hline 3 & 5 \\ -3 & \\ \hline 2 & 3 \\ -2 & \\ \hline 1 & 2 \\ -2 & \\ \hline 0 & \end{array} \quad 2 \quad 1 \quad 1 \quad 1 \quad 2$$

H.C.F. of 8 and 21 is 1.

Hence, 8 and 21 are co-primes.

(*iii*) 54, 144

$$\begin{array}{r|l} 54 & 144 \\ -108 & \\ \hline 36 & 54 \\ -36 & \\ \hline 18 & 36 \\ -36 & \\ \hline 0 & \end{array} \quad 2 \quad 1 \quad 2$$

H.C.F. of 54 and 144 is 18.

So, 54 and 144 are not co-primes.

(*iv*) 161, 192

$$\begin{array}{r} 161\overline{)192}(1 \\ -161 \\ \hline 31\overline{)161}(5 \\ -155 \\ \hline 6\overline{)31}(5 \\ -30 \\ \hline 1\overline{)6}(6 \\ -6 \\ \hline 0 \end{array}$$

H.C.F. of 161 and 192 is 1.

Hence, 161 and 192 are co-primes.

2. (*i*) The numbers are 398, 436 and 542.

Let us first find H.C.F. of 398 and 436.

$$\begin{array}{r} 398\overline{)436}(1 \\ -398 \\ \hline 38\overline{)398}(10 \\ -380 \\ \hline 18\overline{)38}(2 \\ -36 \\ \hline 2\overline{)18}(9 \\ -18 \\ \hline 0 \end{array}$$

H.C.F. of 398 and 436 is 2.

Now, we find H.C.F. of 2 and 542.

$$\begin{array}{r} 2\overline{)542}(271 \\ -542 \\ \hline 0 \end{array}$$

H.C.F. of 2 and 542 is 2.

Hence, H.C.F. of 398, 436 and 542 is 2.

(*ii*) The numbers are 150, 140, and 210.

Let us first find H.C.F of 150 and 140.

$$\begin{array}{r} 140\overline{)150}(1 \\ -140 \\ \hline 10\overline{)140}(14 \\ -140 \\ \hline 0 \end{array}$$

H.C.F. of 140 and 150 is 10.

Now, we find H.C.F. of 10 and 210.

$$\begin{array}{r} 10\overline{)210}(21 \\ -210 \\ \hline 0 \end{array}$$

H.C.F. of 10 and 210 is 10.

Hence, H.C.F. of 140, 150 and 210 is 10.

(*iii*) The numbers are 2057 and 3267.

$$\begin{array}{r} 2057\overline{)3267}(1 \\ -2057 \\ \hline 1210\overline{)2057}(1 \\ -1210 \\ \hline 847\overline{)1210}(1 \\ -847 \\ \hline 363\overline{)847}(2 \\ -726 \\ \hline 121\overline{)363}(3 \\ -363 \\ \hline 0 \end{array}$$

Hence, H.C.F. of 2057 and 3267 is 121.

(*iv*) The numbers are 1440, 1800 and 1920.

Let us find H.C.F. of 1440 an 1800.

$$\begin{array}{r} 1440\overline{)1800}(1 \\ -1440 \\ \hline 360\overline{)1440}(4 \\ -1440 \\ \hline 0 \end{array}$$

H.C.F. of 1440 and 1800 is 360.

Now, we find H.C.F. of 360 and 1920.

$$\begin{array}{r} 360\overline{)1920}(5 \\ -1800 \\ \hline 120\overline{)360}(3 \\ -360 \\ \hline 0 \end{array}$$

H.C.F. of 360 and 1920 is 120.

Hence, H.C.F. of 1440, 1800 and 1920 is 120.

(*v*) The numbers are 276 and 1242.

$$\begin{array}{r} 276\overline{)1242}(4 \\ -1104 \\ \hline 138\overline{)276}(2 \\ -276 \\ \hline 0 \end{array}$$

Hence, H.C.F. of 276 and 1242 is 138.

(*vi*) The given numbers are 144, 180 and 192.

Let us find H.C.F. of 144 and 180.

$$\begin{array}{r} 144\overline{)180}(1 \\ -144 \\ \hline 36\overline{)144}(4 \\ -144 \\ \hline 0 \end{array}$$

The H.C.F. of 144 and 180 is 36.

Now, we find H.C.F. of 36 and 192.

$$\begin{array}{r} 36\overline{)\,192\,(5} \\ -180 \\ \hline 12\overline{)\,36\,(3} \\ -36 \\ \hline 0 \end{array}$$

H.C.F. of 36 and 192 is 12.

Hence, H.C.F. of 144, 180 and 192 is 12.

3. The given numbers are 96, 240 and 336.

Let us first find H.C.F. of 96 and 240.

$$\begin{array}{r} 96\overline{)\,240\,(2} \\ -192 \\ \hline 48\overline{)\,96\,(2} \\ -96 \\ \hline 0 \end{array}$$

H.C.F. of 96 and 240 is 48.

Now, we find H.C.F. of 48 and 336.

$$\begin{array}{r} 48\overline{)\,336\,(7} \\ -336 \\ \hline 0 \end{array}$$

H.C.F. of 48 and 336 is 48.

Hence, H.C.F. of 96, 240 and 336 is 48.

4. (*i*) $\frac{312}{507}$

For reducing the given fraction into lowest terms, we divide numerator and denominator by their H.C.F. Let us find H.C.F. of 312 and 507.

$$\begin{array}{r} 312\overline{)\,507\,(1} \\ -312 \\ \hline 195\overline{)\,312\,(1} \\ -195 \\ \hline 117\overline{)\,195\,(1} \\ -117 \\ \hline 78\overline{)\,117\,(1} \\ -78 \\ \hline 39\overline{)\,78\,(2} \\ -78 \\ \hline 0 \end{array}$$

H.C.F. of 312 and 507 is 39.

$$\frac{312}{507} = \frac{312 \div 39}{507 \div 39} = \frac{8}{13} \text{ (lowest terms)}$$

(*ii*) $\frac{289}{391}$

Let us find the H.C.F. of 289 and 391.

$$\begin{array}{r} 289\overline{)\,391\,(1} \\ -289 \\ \hline 102\overline{)\,289\,(2} \\ -204 \\ \hline 85\overline{)\,102\,(1} \\ -85 \\ \hline 17\overline{)\,85\,(5} \\ -85 \\ \hline 0 \end{array}$$

H.C.F. of 289 and 391 is 17.

Now,

$$\frac{289}{391} = \frac{289 \div 17}{391 \div 17} = \frac{17}{23} \text{ (lowest terms)}$$

(*iii*) $\frac{517}{799}$

Let us find H.C.F. of 517 and 799.

$$\begin{array}{r} 517\overline{)\,799\,(1} \\ -517 \\ \hline 282\overline{)\,517\,(1} \\ -282 \\ \hline 235\overline{)\,282\,(1} \\ -235 \\ \hline 47\overline{)\,235\,(5} \\ -235 \\ \hline 0 \end{array}$$

H.C.F. of 517 and 799 is 47.

Now,

$$\frac{517}{799} = \frac{517 \div 47}{799 \div 47} = \frac{11}{17} \text{ (lowest terms)}$$

(*iv*) $\frac{689}{477}$

Let us find H.C.F. of 689 and 477.

$$\begin{array}{r} 477\overline{)\,689\,(1} \\ -477 \\ \hline 212\overline{)\,477\,(2} \\ -424 \\ \hline 53\overline{)\,212\,(4} \\ -212 \\ \hline 0 \end{array}$$

H.C.F. of 689 and 477 is 53.

Now,

$$\frac{689}{477} = \frac{689 \div 53}{477 \div 53} = \frac{13}{9} \text{ (lowest terms)}$$

5. If we subtract the remainders from the given numbers 75 and 54, we will have the numbers which will be exactly divisible by their H.C.F.

75 – 3 = 72 and 54 – 6 = 48.

Now, we will find the H.C.F. of 72 and 48.

$$\begin{array}{r} 48\overline{)\,72\,(1} \\ -48 \\ \hline 24\overline{)\,48\,(2} \\ -48 \\ \hline 0 \end{array}$$

The H.C.F. of 72 and 48 is 24.

Thus, the required number is 24.

6. 228 – 3 = 225

305 – 5 = 300

382 – 7 = 375

We will find H.C.F. of 225, 300 and 375.

Let us first find H.C.F. of 225 and 300.

$$\begin{array}{r} 225\overline{)\,300\,(1} \\ -225 \\ \hline 75\overline{)\,225\,(3} \\ -225 \\ \hline 0 \end{array}$$

H.C.F. of 225 and 300 is 75.

Now, we find the H.C.F. of 75 and 375.

$$\begin{array}{r} 75\overline{)375(5} \\ -375 \\ \hline 0 \end{array}$$

H.C.F. of 75 and 375 is 75.

Thus, the H.C.F. of 225, 300 and 375 is 75.

Thus, the required number is 75.

7. 245 – 5 = 240

1029 – 5 = 1024

We will find the H.C.F. of 240 and 1024.

$$\begin{array}{r} 240\overline{)1024(4} \\ -960 \\ \hline 64\overline{)\,240\,(3} \\ -192 \\ \hline 48\overline{)\,64\,(1} \\ -48 \\ \hline 16\overline{)\,48\,(3} \\ -48 \\ \hline 0 \end{array}$$

H.C.F. of 240 and 1024 is 16.

Thus, the required number is 16.

8. The greatest possible length of plank

= H.C.F. of 54, 36 and 24

Let us find H.C.F. of 54 and 36.

$$\begin{array}{r} 36\overline{)\,54\,(1} \\ -36 \\ \hline 18\overline{)\,36\,(2} \\ -36 \\ \hline 0 \end{array}$$

H.C.F. of 54 and 36 is 18.

Now, we will find H.C.F. of 18 and 24.

$$\begin{array}{r} 18\overline{)\,24\,(1} \\ -18 \\ \hline 6\overline{)\,18\,(3} \\ -18 \\ \hline 0 \end{array}$$

H.C.F. of 18 and 24 is 6.

$\therefore$ H.C.F. of 54, 36 and 24 is 6.

Hence, greatest possible length of each plank is 6 m.

9. We have,

6 m 58 cm = 658 cm

9 m 40 cm = 940 cm

11m 28 cm = 1128 cm

The length of longest tape which can be used to measure the given lengths = H.C.F. of 658, 940 and 1128.

Let us first find H.C.F. of 658 and 940.

$$\begin{array}{r} 658\overline{)\,940\,(1} \\ -658 \\ \hline 282\overline{)\,658\,(2} \\ -564 \\ \hline 94\overline{)\,282\,(3} \\ -282 \\ \hline 0 \end{array}$$

H.C.F. of 658 and 940 is 94.

Now, we will find H.C.F. of 94 and 1128.

$$\begin{array}{r} 94\overline{)1128(12} \\ -1128 \\ \hline 0 \end{array}$$

H.C.F. of 94 and 1128 is 94.

$\therefore$ H.C.F. of 658, 940 and 1128 is 94.

Hence, the length of the longest tape is 94 cm.

10. 4.8 m = 4.8 × 100 cm = 480 cm

5.04 m = 5.04 × 100 cm = 504 cm

The size of the largest square tile = H.C.F. of 480 and 504.

$$\begin{array}{r} 480\overline{)\,504\,(1} \\ -480 \\ \hline 24\overline{)\,480\,(20} \\ -480 \\ \hline 0 \end{array}$$

H.C.F. of 480 and 504 is 24.

Hence, the required size of largest square tile is 24 cm.

11. The capacity of the largest bucket = H.C.F. of 272 and 425.

$$\begin{array}{r} 272\overline{)\,425\,(1} \\ -272 \\ \hline 153\overline{)\,272\,(1} \\ -153 \\ \hline 119\overline{)\,153\,(1} \\ -119 \\ \hline 34\overline{)\,119\,(3} \\ -102 \\ \hline 17\overline{)\,34\,(2} \\ -34 \\ \hline 0 \end{array}$$

H.C.F. of 272 and 425 is 17.

Hence, the capacity of largest bucket is 17 litres.

12. The maximum number of students in each row = H.C.F. 24, 36 and 60.

$$\begin{array}{r} 24\overline{)\ 36\ (1} \\ -24 \\ \hline 12\overline{)\ 24\ (2} \\ -24 \\ \hline 0 \end{array} \qquad \begin{array}{r} 12\overline{)\ 60\ (5} \\ -60 \\ \hline 0 \end{array}$$

H.C.F. of 24, 36 and 60 is 12.

Hence, the maximum number of students in each row is 12.

EXERCISE 3.6

1.

2 | 24
2 | 12
2 | 6
3 | 3
| 1

2 | 18
3 | 9
3 | 3
| 1

$24 = 2 \times 2 \times 2 \times 3$

$18 = 2 \times 3 \times 3$

Here, 2 occurs maximum number of three times and 3 occurs maximum number of two times. Therefore, the required L.C.M. is $(2 \times 2 \times 2) \times (3 \times 3) = 72$.

2.

2 | 12
2 | 6
3 | 3
| 1

3 | 15
5 | 5
| 1

2 | 20
2 | 10
5 | 5
| 1

$12 = 2 \times 2 \times 3$

$15 = 3 \times 5$

$20 = 2 \times 2 \times 5$

Here, 2 occurs maximum number of two times and 3, 5 occur maximum number of times only once.

The required L.C.M. is $(2 \times 2) \times 3 \times 5 = 60$.

3.

3 | 21
7 | 7
| 1

2 | 28
2 | 14
7 | 7
| 1

2 | 36
2 | 18
3 | 9
3 | 3
| 1

$21 = 3 \times 7$

$28 = 2 \times 2 \times 7$

$36 = 2 \times 2 \times 3 \times 3$

Here, 2 and 3 occur maximum number of two times and 7 occurs maximum number of times only once.

The required L.C.M. is $(2 \times 2) \times (3 \times 3) \times 7 = 252$.

4.

2 | 16
2 | 8
2 | 4
2 | 2
| 1

2 | 20
2 | 10
5 | 5
| 1

2 | 40
2 | 20
2 | 10
5 | 5
| 1

$16 = 2 \times 2 \times 2 \times 2$

$20 = 2 \times 2 \times 5$

$40 = 2 \times 2 \times 2 \times 5$

Here, 2 occurs maximum number of four times and 5 occurs only once.

The required L.C.M. is $(2 \times 2 \times 2 \times 2) \times 5 = 80$.

5.

2 | 84
2 | 42
3 | 21
7 | 7
| 1

2 | 90
3 | 45
3 | 15
5 | 5
| 1

2 | 120
2 | 60
2 | 30
3 | 15
5 | 5
| 1

$84 = 2 \times 2 \times 3 \times 7$

$90 = 2 \times 3 \times 3 \times 5$

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

Here, 2 occurs maximum number of three times, 3 occurs maximum number of two times and 5, 7 occur maximum number of times only once.

The required L.C.M. is $(2 \times 2 \times 2) \times (3 \times 3) \times 7 \times 5 = 2520$.

6.

2 | 14
7 | 7
| 1

2 | 24
2 | 12
2 | 6
3 | 3
| 1

2 | 48
2 | 24
2 | 12
2 | 6
3 | 3
| 1

$14 = 2 \times 7$

$24 = 2 \times 2 \times 2 \times 3$

$48 = 2 \times 2 \times 2 \times 2 \times 3$

Here, 2 occurs maximum number of 4 times and 7, 3 occur maximum number of times only once.

The required L.C.M. is $2 \times 2 \times 2 \times 2 \times 3 \times 7 = 336$.

7.

3 | 9
3 | 3
| 1

2 | 12
2 | 6
3 | 3
| 1

2 | 24
2 | 12
2 | 6
3 | 3
| 1

$9 = 3 \times 3$

$12 = 2 \times 2 \times 3$

$24 = 2 \times 2 \times 2 \times 3$

Here, 2 occurs maximum number of three times and 3 occurs maximum number of two times.

The required L.C.M. is $2 \times 2 \times 2 \times 3 \times 3 = 72$

8.

2 | 24
2 | 12
2 | 6
3 | 3
1

2 | 48
2 | 24
2 | 12
2 | 6
3 | 3
1

2 | 80
2 | 40
2 | 20
2 | 10
5 | 5
1

$24 = 2 \times 2 \times 2 \times 3$

$48 = 2 \times 2 \times 2 \times 2 \times 3$

$80 = 2 \times 2 \times 2 \times 2 \times 5$

Here, 2 occurs maximum number of four times and 3, 5 occur maximum number of times only once.

The required L.C.M. is $2 \times 2 \times 2 \times 2 \times 3 \times 5 = 240$.

9.

11 | 121
11 | 11
1

11 | 1331
11 | 121
11 | 11
1

$121 = 11 \times 11$

$1331 = 11 \times 11 \times 11$

Here, 11 occurs maximum number of three times.

Thus, the required L.C.M. is $11 \times 11 \times 11 = 1331$.

10.

2 | 42
3 | 21
7 | 7
1

2 | 56
2 | 28
2 | 14
7 | 7
1

2 | 132
2 | 66
3 | 33
11 | 11
1

$42 = 2 \times 3 \times 7$

$56 = 2 \times 2 \times 2 \times 7$

$132 = 2 \times 2 \times 3 \times 11$

Here, 2 occurs maximum number of three times and 3, 7, 11 occur only once.

The required L.C.M. is $2 \times 2 \times 2 \times 3 \times 7 \times 11 = 1848$.

EXERCISE 3.7

1.

2 | 6, 8, 45
3 | 3, 4, 45
1, 4, 15

L.C.M. of 6, 8 and 45 is $2 \times 3 \times 4 \times 15 = 360$.

2.

3 | 9, 18, 21
3 | 3, 6, 7
1, 2, 7

L.C.M. of 9, 18, 21 is $3 \times 3 \times 2 \times 7 = 126$.

3.

2 | 15, 20, 30
3 | 15, 10, 15
5 | 5, 10, 5
1, 2, 1

L.C.M. of 15, 18, 21 is $2 \times 3 \times 5 \times 2 = 60$

4.

3 | 105, 315, 693
3 | 35, 105, 231
5 | 35, 35, 77
7 | 7, 7, 77
1, 1, 11

L.C.M. of 105, 315 and 693 is

$3 \times 3 \times 5 \times 7 \times 11 = 3465$

5.

2 | 20, 24, 36
2 | 10, 12, 18
3 | 5, 6, 9
5, 2, 3

L.C.M. of 20, 24 and 36 is

$2 \times 2 \times 3 \times 5 \times 2 \times 3 = 360$

6.

2 | 12, 15, 36, 45
2 | 6, 15, 18, 45
3 | 3, 15, 9, 45
3 | 1, 5, 3, 15
5 | 1, 5, 1, 5
1, 1, 1, 1

L.C.M. of 12, 15, 36 and 45 is

$2 \times 2 \times 3 \times 3 \times 5 = 180$

7.

2 | 15, 16, 35, 36
2 | 15, 8, 35, 18
3 | 15, 4, 35, 9
5 | 5, 4, 35, 3
1, 4, 7, 3

L.C.M. of 15, 16, 35 and 36 is

$2 \times 2 \times 3 \times 5 \times 4 \times 7 \times 3 = 5040$

8.

2	15, 24, 36
2	15, 12, 18
3	15, 6, 9
	5, 2, 3

L.C.M. of 15, 24 and 36 is

$2 \times 2 \times 3 \times 5 \times 2 \times 3 = 360$.

9.

2	180, 384, 144
2	90, 192, 72
2	45, 96, 36
2	45, 48, 18
3	45, 24, 9
3	15, 8, 3
	5, 8, 1

L.C.M. of 180, 384 and 144 is

$2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 8 = 5760$.

10.

2	88, 66, 132
2	44, 33, 66
3	22, 33, 33
11	22, 11, 11
	2, 1, 1

L.C.M. of 88, 66 and 132 is

$2 \times 2 \times 3 \times 11 \times 2 = 264$.

11.

2	21, 28, 36, 45
2	21, 14, 18, 45
3	21, 7, 9, 45
3	7, 7, 3, 15
7	7, 7, 1, 5
	1, 1, 1, 5

L.C.M. of 21, 28, 36 and 45 is

$2 \times 2 \times 3 \times 3 \times 7 \times 5 = 1260$.

12.

2	102, 170, 136
17	51, 85, 68
	3, 5, 4

L.C.M. of 102, 170 and 136 is

$2 \times 17 \times 3 \times 5 \times 4 = 2040$

13. We find the L.C.M. of 15, 20, 25 and 45.

3	15, 20, 25, 45
5	5, 20, 25, 15
	1, 4, 5, 3

L.C.M. of 15, 20, 25 and 45 is

$3 \times 5 \times 4 \times 5 \times 3 = 900$

900 is the least number which is exactly divisible by the given numbers.

We require the least number that leaves remainder 8 in each case.

So, the required number is $900 + 8 = 908$.

14. The least number divisible by numbers 15, 20, 24, 32 and 36 is their L.C.M.

2	15, 20, 24, 32, 36
2	15, 10, 12, 16, 18
2	15, 5, 6, 8, 9
3	15, 5, 3, 4, 9
5	5, 5, 1, 4, 3
	1, 1, 1, 4, 3

L.C.M. of 15, 20, 24, 32 and 36 is

$2 \times 2 \times 2 \times 3 \times 5 \times 4 \times 3 = 1440$

Hence, required least number is 1440.

15. The smallest number divisible by 585 and 624 is their L.C.M.

3	585, 624
13	195, 208
	15, 16

L.C.M. of 585 and 624 is $3 \times 13 \times 15 \times 16 = 9360$

Hence, the required smallest number is 9360.

16. The number exactly divisible by 72 and 108 is their L.C.M.

2	72, 108
2	36, 54
3	18, 27
3	6, 9
	2, 3

L.C.M. of 72 and 108 is $2 \times 2 \times 3 \times 3 \times 2 \times 3 = 216$.

Smallest number of 5-digit is 10000.

$$
\begin{array}{r|l}
216 & 10000 \ (46 \\
 & -864 \\
 & \hline
 & 1360 \\
 & -1296 \\
 & \hline
 & 64
\end{array}
$$

We find that, when 10000 is divided by 216, the remainder is 64.

Thus, the required smallest number of 5-digits

= 10000 + (216 – 64)

= 10152

Hence, the required number is 10152.

17. The number exactly divisible by 15, 20 and 25 is their L.C.M.

$$\begin{array}{r|l} 5 & 15,\ 20,\ 25 \\ \hline & 3,\ 4,\ 5 \end{array}$$

L.C.M. of 15, 20 and 25 is 5 × 3 × 4 × 5 = 300

The smallest number of six-digits is 100000.

$$\begin{array}{r} 300\overline{)100000}\,(333 \\ -900 \\ \hline 1000 \\ -900 \\ \hline 1000 \\ -900 \\ \hline 100 \end{array}$$

We find that, when 100000 is divided by 300, the remainder is 100.

Thus, the required least six digit number

= 100000 + (300 – 100)

= 100000 + 200

= 100200

Hence, the required number is 100200.

18. The least number which is exactly divisible by 16, 24 and 36 is their L.C.M.

$$\begin{array}{r|l} 2 & 16,\ 24,\ 36 \\ \hline 2 & 8,\ 12,\ 18 \\ \hline 2 & 4,\ 6,\ 9 \\ \hline 3 & 2,\ 3,\ 9 \\ \hline & 2,\ 1,\ 3 \end{array}$$

L.C.M. of 16, 24 and 36 is

2 × 2 × 2 × 3 × 2 × 3 = 144

When 26 is subtracted from the required number, it is exactly divisible by 16, 24 and 36.

Thus, the required number is 144 + 26 = 170.

19. To find the time when all the rings ring together, we have to find L.C.M. of 9, 12, 15 and 18.

$$\begin{array}{r|l} 2 & 9,\ 12,\ 15,\ 18 \\ \hline 3 & 9,\ 6,\ 15,\ 9 \\ \hline 3 & 3,\ 2,\ 5,\ 3 \\ \hline & 1,\ 2,\ 5,\ 1 \end{array}$$

L.C.M. of 9, 12, 15, and 18 is

2 × 3 × 3 × 2 × 5 = 180

Hence, they all will ring together after 180 seconds or 3 minutes.

EXERCISE 3.8

1. (*i*) H.C.F. of the given numbers 64 and 84.

$$\begin{array}{r} 64\overline{)84}\,(1 \\ -64 \\ \hline 20\overline{)64}\,(3 \\ -60 \\ \hline 4\overline{)20}\,(5 \\ -20 \\ \hline 0 \end{array}$$

H.C.F. of 64 and 84 is 4.

L.C.M. of given numbers 64 and 84.

$$\begin{array}{r|l} 2 & 64,\ 84 \\ \hline 2 & 32,\ 42 \\ \hline & 16,\ 21 \end{array}$$

L.C.M of 64 and 84 is 2 × 2 × 16 × 21 = 1344

Now,

Product of two numbers = 64 × 84 = 5376

Product of their H.C.F. and L.C.M

= 4 × 1344 = 5376

Hence, product of two numbers = product of their H.C.F and L.C.M.

(*ii*)

$$\begin{array}{r|l} 2 & 48 \\ \hline 2 & 24 \\ \hline 2 & 12 \\ \hline 2 & 6 \\ \hline 3 & 3 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 2 & 96 \\ \hline 2 & 48 \\ \hline 2 & 24 \\ \hline 2 & 12 \\ \hline 2 & 6 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

48 = 2 × 2 × 2 × 2 × 3

96 = 2 × 2 × 2 × 2 × 2 × 3

H.C.F. of 48 and 96 is 2 × 2 × 2 × 2 × 3 = 48

And L.C.M. of 48 and 96 is 2 × 2 × 2 × 2 × 2 × 3 = 96

Product of two numbers = 48 × 96

Product of their H.C.F and L.C.M. = 48 × 96

Hence, product of two numbers = product of their H.C.F. and L.C.M.

(*iii*) $27 = 3 \times 3 \times 3$

$81 = 3 \times 3 \times 3 \times 3$

H.C.F. of 27 and 81 is $3 \times 3 \times 3 = 27$

And, L.C.M. of 27 and 81 is $3 \times 3 \times 3 \times 3 = 81$

Now, product of two numbers = 27×81

Product of their H.C.F. and L.C.M. = 27×81

Hence, product of two numbers = product of their H.C.F. and L.C.M.

(*iv*)

3 | 15
5 | 5
| 1

5 | 35
7 | 7
| 1

$15 = 3 \times 5$

$35 = 5 \times 7$

H.C.F. of 15 and 35 is 5.

And L.C.M. of 15 and 35 is $3 \times 5 \times 7 = 105$

Now, product of two numbers = $15 \times 35 = 525$

Product of their H.C.F and L.C.M. = $5 \times 105 = 525$

Hence, product of two numbers = product of their H.C.F. and L.C.M.

(*v*)

3 | 117
3 | 39
13 | 13
| 1

13 | 221
17 | 17
| 1

$117 = 3 \times 3 \times 13$

$221 = 13 \times 17$

H.C.F. of 117 and 221 is 13.

L.C.M. of 117 and 221 is $3 \times 3 \times 13 \times 17 = 1989$

Now, product of two numbers = 117×221

$= 25857$

Product of their H.C.F. and L.C.M. = 1989×13

$= 25857$

Hence, product of two numbers = product of their H.C.F. and L.C.M.

2. (*i*)

2 | 60
2 | 30
3 | 15
5 | 5
| 1

3 | 75
5 | 25
5 | 5
| 1

$60 = 2 \times 2 \times 3 \times 5$

$75 = 3 \times 5 \times 5$

H.C.F. of 60 and 75 is $3 \times 5 = 15$

L.C.M. of 60 and 75 is $2 \times 2 \times 5 \times 5 \times 3 = 300$

Hence, H.C.F. = 15, L.C.M. = 300.

(*ii*)

2 | 234
3 | 117
3 | 39
13 | 13
| 1

2 | 572
2 | 286
11 | 143
13 | 13
| 1

$234 = 2 \times 3 \times 3 \times 13$

$572 = 2 \times 2 \times 11 \times 13$

H.C.F. of 234 and 572 is $2 \times 13 = 26$

L.C.M. of 234 and 572 is

$2 \times 2 \times 3 \times 3 \times 11 \times 13 = 5148$

Hence, H.C.F. = 26, L.C.M. = 5148.

(*iii*)

3 | 861
7 | 287
41 | 41
| 1

3 | 1353
11 | 451
41 | 41
| 1

$861 = 3 \times 7 \times 41$

$1353 = 3 \times 11 \times 41$

H.C.F. of 861 and 1353 is $3 \times 41 = 123$

L.C.M. of 861 and 1353 is $3 \times 7 \times 11 \times 41 = 9471$

Hence, H.C.F. = 123, L.C.M. = 9471.

3. We have

I number × II number = H.C.F. × L.C.M.

$\Rightarrow$ $64 \times$ II number $= 8 \times 576$

$$\Rightarrow \text{II number} = \frac{8 \times 576}{64} = 72$$

Hence, the other number is 72.

4. We have,

Product of two numbers = H.C.F. × L.C.M.

$\Rightarrow$ $864 =$ H.C.F. $\times 72$

$$\Rightarrow \text{H.C.F.} = \frac{864}{72} = 12$$

Hence, H.C.F. of the numbers is 12.

5. We have,

Product of two numbers = H.C.F. × L.C.M.

$\Rightarrow$ $6400 = 16 \times$ L.C.M.

$$\Rightarrow \text{L.C.M.} = \frac{6400}{16} = 400$$

Hence, L.C.M. of the numbers is 400.

6. No, since H.C.F. of two or more numbers is a factor of their L.C.M. Here, 14 is not a factor of 276.

7. We have,

I number × II number = H.C.F. × L.C.M.

$\Rightarrow$ 435 × II number = 145 × 2175

$\Rightarrow$ $\text{II number} = \frac{145 \times 2175}{435} = 725$

Hence, the other number is 725.

8.

2	1224
2	612
2	306
3	153
3	51
17	17
	1

2	1768
2	884
2	442
13	221
17	17
	1

$1224 = 2 \times 2 \times 2 \times 3 \times 3 \times 17$

$1768 = 2 \times 2 \times 2 \times 13 \times 17$

H.C.F. of 1224 and 1768 is

$2 \times 2 \times 2 \times 17 = 136$

H.C.F. × L.C.M. = product of two numbers

$\Rightarrow$ $136 \times \text{L.C.M.} = 1224 \times 1768$

$\Rightarrow$ $\text{L.C.M.} = \frac{1224 \times 1768}{136} = 15912$

Hence, H.C.F. = 136, L.C.M. = 15912.

9. $\because$ H.C.F. of two co-prime numbers is 1.

We have,

I number × II number= H.C.F. × L.C.M.

$\Rightarrow$ 75 × II number = 1 × 4875

$\Rightarrow$ $\text{II number} = \frac{4875}{75}$

$= 65$

Hence, the other number is 65.

10. We have,

I number × II number = H.C.F. × L.C.M.

$\Rightarrow$ $276 \times 1242 = 138 \times \text{L.C.M.}$

$\Rightarrow$ $\text{L.C.M.} = \frac{276 \times 1242}{138}$

$= 2484$

Hence, L.C.M. is 2484.

MULTIPLE CHOICE QUESTIONS

1. A number is divisible by 11, if the difference of the sum of digits at odd places and the sum of digits at even places is either zero or multiple of 11.

For option (*a*)

The given number is 901351

Sum of digits in odd places = 1 + 3 + 0 = 4

Sum of digits in even places = 5 + 1 + 9 = 15

Difference of two sums = 15 – 4 = 11

So, 901351 is divisible by 11.

Hence, option (*a*) is correct.

2. A number is divisible by 6, if it is divisible by 2 and 3 both.

For option (a):

The given number is 79124. Since last digit 4 of number 79124 is even, so the number is divisible by 2.

Also, sum of digits of number is 7 + 9 + 1 + 2 + 4 = 23 is not divisible by 3.

So the number is not divisible by 3.

Thus, the number 79124 is not divisible by 6.

For option (b):

The given number is 92346.

Since last digit 6 of number 92346 is even, so the number is divisible by 2.

Also, sum of digits of 92346 is 9 + 2 + 3 + 4 + 6 = 24 is divisible by 3.

Thus, the number 92346 is divisible by 6.

For option (c):

The given number is 639210.

Since, last digit of the number 639210 is 0.

So, the number is divisible by 2.

Also, the sum of digits of number 639210

(6 + 3 + 9 + 2 + 1 + 0) = 21, is divisible by 3. So, the number is divisible by 3.

Thus, the number 639210 is divisible by 6.

For option (d):

The given number is 467091.

Since last digit 1 of number 467091 is odd. So, it is not divisible by 2.

Thus, the number is not divisible by 6.

Hence, options (*b*) and (*c*) are correct.

3. ***For option (a):***

Number 263 is not divisible by any prime number less than 20.

So, it is a prime number.

For option (b):

Number 331 is not divisible by any prime number less than 20.

So, it is also a prime number.

For option (c):

Number 1113 is divisible by prime numbers 3 and 7.

So, it is not a prime number.

For option (d):

The number 3417 is divisible by 3 and 17.

So, it is not a prime number.

Hence, options (*a*) and (*b*) are correct.

4. The smallest prime number is 2.
Hence, option (*c*) is correct.

5. Co-primes are those which have no common factor except 1.

For option (a):

Factors of 42 are 1, 2, 3, 6, 7, 14, 21, 42.

Factors of 20 are 1, 2, 4, 5, 10, 20.

Common factors of 42 and 20 are 1 and 2.

So, it is not a pair of co-primes.

For option (b):

Factors of 27 are 1, 3, 9, 27.

Factors of 72 are 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36 and 72.

Common factors of 27 and 72 are 1, 3 and 9.

So, it is not a pair of co-primes.

For option (c):

Factors of 35 are 1, 5, 7, 35.

Factors of 37 are 1, 37.

Common factor of 35 and 37 is 1.

So, it is a pair of co-primes.

Hence, option (*c*) is correct.

6. Numbers having more than two factors are called composite numbers.

For option (a):

Factors of 29 are 1 and 29.

So, it is not a composite number.

For option (b):

Factors of 41 are 1 and 41.

So, it is not a composite number.

For option (c):

Factors of 39 are 1, 3, 13 and 39.

So, it is a composite number.

For option (d):

Factors of 59 are 1 and 59.

So, it is not a composite number.

Hence, option (*c*) is correct.

7. We have,

$$\text{I number} \times \text{II number} = \text{H.C.F.} \times \text{L.C.M.}$$

$$\Rightarrow \quad 12 \times \text{II number} = 192$$

$$\Rightarrow \quad \text{II number} = \frac{192}{12} = 16$$

Hence, option (*b*) is correct.

8. If the sum of all the factors of a number is twice the number, then the number is called a perfect number.

For option (a):

Factors of 6 are 1, 2, 3 and 6.

Sum of factors is $(1 + 2 + 3 + 6) = 12 = 2 \times 6$

Thus, 6 is a perfect number.

For option (b):

Factors of 8 are 1, 2, 4 and 8.

Sum of factors is $(1 + 2 + 4 + 8) = 15$

Thus, 8 is not a perfect number.

For option (c):

The factors of 12 are 1, 2, 3, 4, 6 and 12.

Sum of factors is $(1 + 2 + 3 + 4 + 6 + 12) = 28$

Thus, 12 is not a perfect number.

For option (d):

The factors of 9 are 1, 3 and 9.

Sum of factors is $(1 + 3 + 9) = 13$

Thus, 9 is not a perfect number.

Hence, option (*a*) is correct.

9. 2 is the only even prime number.
Hence, option (*b*) is correct.

10. Let the two numbers be $3x$ and $4x$.

H.C.F. of $3x$ and $4x = x$.

$\because$ H.C.F. of the numbers is 4.

$\therefore \quad x = 4$

So, the numbers are $3 \times 4 = 12$ and $4 \times 4 = 16$.

Now, L.C.M. of 12 and 16.

2	12, 16
2	6, 8
	3, 4

L.C.M. of the numbers $= 2 \times 2 \times 3 \times 4 = 48$

Hence, option (*a*) is correct.

MENTAL MATHS CORNER

A: 'True' or 'False' :

1. The L.C.M. of given numbers is always greater than any of two numbers. **(True)**

2. If a number is divisible by 3, it must be divisible by 9. **(False)**

3. The sum of two consecutive odd numbers is always divisible by 4. **(True)**

4. If a number exactly divides the sum of two numbers, it must exactly divides the numbers separately. **(False)**

5. The H.C.F. of two co-primes is always 1. **(True)**

6. 1 is the smallest prime number. **(False)**

7. Odd numbers are not multiples of 2. **(True)**
8. The sum of two prime numbers is always a prime number. **(False)**
9. A composite number can be written as the sum of two primes. **(True)**
10. Every prime number has exactly two factors. **(True)**

B: Fill in the blanks:

1. 1 is the number having exactly one factor.
2. The smallest composite odd number is 9.
3. H.C.F. of two consecutive even numbers is 2.
4. The smallest prime number greater than 20 is 23 .
5. H.C.F. of 52 and 65 is 13 .

2 | 52
2 | 26
13 | 13
1

5 | 65
13 | 13
1

$52 = 2 \times 2 \times \boxed{13}$

$65 = 5 \times \boxed{13}$

H.C.F. of 52 and 65 is 13.

6. The least number which is exactly divisible by 18, 24 and 36 is 72.

The least number which is exactly divisible by 18, 24 and 36 is their L.C.M.

2 | 18, 24, 36
2 | 9, 12, 18
3 | 9, 6, 9
3 | 3, 2, 3
1, 2, 1

L.C.M. of 18, 24 and 36 is

$2 \times 2 \times 3 \times 3 \times 2 = 72$

7. H.C.F. of two numbers is a factor of their L.C.M.
8. If a number is divided by its factor, the remainder is always zero .
9. The greatest 2-digit prime number is 97.
10. The total number of prime numbers up to 100 is 25.

REVIEW EXERCISE

1. (*i*)

3 | 4335
5 | 1445
17 | 289
17 | 17
1

$\therefore \quad 4335 = 3 \times 5 \times 17 \times 17$

(*ii*)

2 | 1080
2 | 540
2 | 270
3 | 135
3 | 45
3 | 15
5 | 5
1

$\therefore \quad 1080 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5$

(*iii*)

5 | 13915
11 | 2783
11 | 253
23 | 23
1

$\therefore \quad 13915 = 5 \times 11 \times 11 \times 23$

2. (*i*)

2 | 84
2 | 42
3 | 21
7 | 7
1

2 | 120
2 | 60
2 | 30
3 | 15
5 | 5
1

2 | 138
3 | 69
23 | 23
1

$84 = \boxed{2} \times 2 \times \boxed{3} \times 7$

$120 = \boxed{2} \times 2 \times 2 \times \boxed{3} \times 5$

$138 = \boxed{2} \times \boxed{3} \times 23$

H.C.F. of 84, 120 and 138 is $2 \times 3 = 6$.

(*ii*)

3 | 81
3 | 27
3 | 9
3 | 3
1

3 | 117
3 | 39
13 | 13
1

$81 = \boxed{3} \times \boxed{3} \times 3 \times 3$

$117 = \boxed{3} \times \boxed{3} \times 13$

H.C.F. of 81 and 117 is $3 \times 3 = 9$.

(*iii*)

2	630
3	315
3	105
5	35
7	7
	1

2	1188
2	594
3	297
3	99
3	33
11	11
	1

$630 = \boxed{2} \times \boxed{3} \times \boxed{3} \times 5 \times 7$

$1188 = \boxed{2} \times 2 \times \boxed{3} \times \boxed{3} \times 3 \times 11$

H.C.F. of 630 and 1188 is $2 \times 3 \times 3 = 18$.

3. (*i*) The given numbers are 216 and 1176.

$$\begin{array}{l} 216\overline{)1176}(5 \\ \quad -1080 \\ \quad\overline{\quad 96)\ 216\ (2} \\ \quad\quad -192 \\ \quad\quad\overline{\quad\ 24)\ 96\ (4} \\ \quad\quad\quad -96 \\ \quad\quad\quad\overline{\quad 0} \end{array}$$

$\therefore$ H.C.F. of 216 and 1176 is 24.

(*ii*) The given numbers are 2700 and 1728.

$$\begin{array}{l} 1728\overline{)2700}(1 \\ \quad -1728 \\ \quad\overline{\quad 972)1728(1} \\ \quad\quad -972 \\ \quad\quad\overline{\quad 756)\ 972\ (1} \\ \quad\quad\quad -756 \\ \quad\quad\quad\overline{\quad 216)756(3} \\ \quad\quad\quad\quad -648 \\ \quad\quad\quad\quad\overline{\quad 108)216(2} \\ \quad\quad\quad\quad\quad -216 \\ \quad\quad\quad\quad\quad\overline{\quad 0} \end{array}$$

$\therefore$ H.C.F. of 2700 and 1728 is 108.

(*iii*) The given numbers are 768 and 324.

$$\begin{array}{l} 324\overline{)768}(2 \\ \quad -648 \\ \quad\overline{\quad 120)324(2} \\ \quad\quad -240 \\ \quad\quad\overline{\quad 84)120(1} \\ \quad\quad\quad -84 \\ \quad\quad\quad\overline{\quad 36)\ 84(2} \\ \quad\quad\quad\quad -72 \\ \quad\quad\quad\quad\overline{\quad 12)\ 36\ (3} \\ \quad\quad\quad\quad\quad -36 \\ \quad\quad\quad\quad\quad\overline{\quad 0} \end{array}$$

$\therefore$ H.C.F. of 324 and 768 is 12.

4. (*i*)

2	34
17	17
	1

2	40
2	20
2	10
5	5
	1

2	126
3	63
3	21
7	7
	1

$34 = 2 \times 17$

$40 = 2 \times 2 \times 2 \times 5$

$126 = 2 \times 3 \times 3 \times 7$

Here, 2 occurs maximum number of three times, 3 occurs maximum number of two times and 5, 7 and 17 occur maximum number of times only once.

Thus, the L.C.M. of 34, 40 and 126 is

$(2 \times 2 \times 2) \times (3 \times 3) \times 5 \times 7 \times 17 = 42840$

(*ii*)

2	20
2	10
5	5
	1

2	24
2	12
2	6
3	3
	1

2	36
2	18
3	9
3	3
	1

$20 = 2 \times 2 \times 5$

$24 = 2 \times 2 \times 2 \times 3$

$36 = 2 \times 2 \times 3 \times 3$

Here, 2 occurs maximum number of three times, 3 occurs maximum number of two times and 5 occurs only once. Therefore

L.C.M. of 20, 24 and 36 is

$(2 \times 2 \times 2) \times (3 \times 3) \times 5 = 360$.

(*iii*)

2	36
2	18
3	9
3	3
	1

2	54
3	27
3	9
3	3
	1

2	72
2	36
2	18
3	9
3	3
	1

$36 = 2 \times 2 \times 3 \times 3$

$54 = 2 \times 3 \times 3 \times 3$

$72 = 2 \times 2 \times 2 \times 3 \times 3$

Here, 2 and 3 occur maximum number of three times.

Therefore, L.C.M. of 36, 54 and 72 is

$(2 \times 2 \times 2) \times (3 \times 3 \times 3) = 216$.

5. (*i*)

2	70, 65, 75, 80
5	35, 65, 75, 40
	7, 13, 15, 8

L.C.M. of 70, 65, 75 and 80 is

$2 \times 5 \times 7 \times 13 \times 15 \times 8 = 109200$

(*ii*)

2	21, 28, 36, 45
2	21, 14, 18, 45
3	21, 7, 9, 45
3	7, 7, 3, 15
7	7, 7, 1, 5
	1, 1, 1, 5

L.C.M. of 21, 28, 36 and 45 is

$2 \times 2 \times 3 \times 3 \times 7 \times 5 = 1260$

6. We have,

Product of two numbers = product of their H.C.F. and L.C.M.

$\Rightarrow$ $33327 = 23 \times$ L.C.M.

$\Rightarrow$ L.C.M. $= \frac{33327}{23} = 1449$

Hence, L.C.M. is 1449.

7. (*i*) Let us take a number 134.

Since, 134 is divisible by 2 as its ones digit is 4.

but the number formed by last two digits of 134 *i.e.*, 34 is not divisible by 4.

So, the number 134 is divisible by 2 but not by 4.

(*ii*) Let us take a number 60, it is divisible by 4 but not by 8.

(*iii*) Let us take a number 104.

104 is divisible by 2 as its ones digit is 4.

Also, 104 is divisible by 8.

But 104 is not divisible by 16.

Hence, 104 is divisible by both 2 and 8 but not by 16.

(*iv*) A number is divisible by 11, if the difference of the sums of the digits in even places and in odd places is either 0 or a multiple of 11.

Thus, the number which is divisible by 11 and ends with 9 is 1199.

As,

Sum of digits in odd places = 9 + 1 = 10

Sum of digits in even places = 9 + 1 = 10

Difference of sums = 10 – 10 = 0

So, the number 1199 is divisible by 11.

8. (*i*) For reducing the given fraction to lowest terms, we divide the numerator and denominator by their H.C.F.

$$\begin{array}{r} 1288\overline{)1449}(1 \\ -1288 \\ \hline 161\overline{)1288}(8 \\ -1288 \\ \hline 0 \end{array}$$

H.C.F. of 1288 and 1449 is 161.

Now,

$\frac{1449}{1288} = \frac{1449 \div 161}{1288 \div 161} = \frac{9}{8}$ (lowest terms)

(*ii*) Let us find the H.C.F. of 5454 and 6363.

$$\begin{array}{r} 5454\overline{)6363}(1 \\ -5454 \\ \hline 909\overline{)5454}(6 \\ -5454 \\ \hline 0 \end{array}$$

H.C.F. of 5454 and 6363 is 909.

Now, $\frac{5454}{6363} = \frac{5454 \div 909}{6363 \div 909} = \frac{6}{7}$ (lowest terms)

(*iii*) Let us find the H.C.F. of 592 and 962.

$$\begin{array}{r} 592\overline{)962}(1 \\ -592 \\ \hline 370\overline{)592}(1 \\ -370 \\ \hline 222\overline{)370}(1 \\ -222 \\ \hline 148\overline{)222}(1 \\ -148 \\ \hline 74\overline{)148}(2 \\ -148 \\ \hline 0 \end{array}$$

H.C.F. of 592 and 962 is 74.

$\therefore$ $\frac{592}{962} = \frac{592 \div 74}{962 \div 74} = \frac{8}{13}$ (lowest terms)

9. The capacity of largest bucket is the H.C.F. of 180 and 204.

$\therefore$ We find the H.C.F. of 180 and 204.

$$\begin{array}{r} 180\overline{)\ 204}(1 \\ -180 \\ \hline 24\overline{)\ 180}(7 \\ -168 \\ \hline 12\overline{)\ 24}(2 \\ -24 \\ \hline 0 \end{array}$$

H.C.F. of 180 and 204 is 12.

Hence, the capacity of largest bucket that can be filled an exact number of times from each bucket is 12 litres.

10. If we subtract the remainders from the numbers 1050 and 1527, we get the numbers which are exactly divisible by their H.C.F.

$\therefore$ $1050 - 5 = 1045$

and $1527 - 7 = 1520$

Now, we will find the H.C.F. of 1045 and 1520.

$$\begin{array}{r} 1045\overline{)1520}(1 \\ -1045 \\ \hline 475\overline{)1045}(2 \\ -950 \\ \hline 95\overline{)475}(5 \\ -475 \\ \hline 0 \end{array}$$

$\therefore$ H.C.F. of 1045 and 1520 is 95.

Hence, the required greatest number is 95.

HOTS QUESTIONS

1. The 8-digit number 136x5785 is divisible by 15. Then, it must be divisible by 3 and 5 both.

The last digit of number is 5, hence, it is divisible by 5.

If the number is divisible by 3, then the sum of the digits is also divisible by 3.

Sum of digits of 136x5785 is

$(1 + 3 + 6 + x + 5 + 7 + 8 + 5) = 35 + x$

To make the sum of the digits divisible by 3, it must be least multiple of 3.

$\therefore$ $35 + x = 36$

$\Rightarrow$ $x = 1$

Thus, the least possible value of x is 1.

2. Number of white balls in the basket = 162

Every 6 white balls are replaced by 12 black balls.

Therefore, the number of black balls in the basket

$$= \frac{162}{6} \times 12$$

$= 27 \times 12 = 324.$

Hence, there are 324 black balls put in the basket.

Puzzle

3	3
5	5
$12 = 3 \times (4)$	$21 = 3 \times (7)$
x	x

$\because$ In both cases L.C.M. are same.

Therefore, the fourth number is $7 \times 4 = 28$.

VALUE BASED QUESTION
SUMMATIVE ASSESSMENT

The largest capacity of tin is the H.C.F. of 600, 864 and 312.

First, we find H.C.F. of 600 and 864.

$$\begin{array}{r} 600\overline{)864}(1 \\ -600 \\ \hline 264\overline{)600}(2 \\ -528 \\ \hline 72\overline{)264}(3 \\ -216 \\ \hline 48\overline{)72}(1 \\ -48 \\ \hline 24\overline{)48}(2 \\ -48 \\ \hline 0 \end{array}$$

H.C.F. of 600 and 864 is 24.

Now, we find H.C.F. of 24 and 312.

$$\begin{array}{r} 24\overline{)312}(13 \\ -312 \\ \hline 0 \end{array}$$

H.C.F. of 24 and 312 is 24.

Thus, H.C.F. of 600, 864 and 312 is 24.

Hence, the greatest capacity of tin is 24 litres.

(*a*) No, the merchant is not correct in mixing the oils.

(*b*) Honesty.