



ST. MARY'S CO-ED SCHOOL, HARDA

[2020-21]

CLASS- VI

SUBJECT- MATHS

CHAPTER- 2

FACTORS AND MULTIPLES.

GLIMPSE OF THE CHAPTER:-

- Factor :- A factor of a number is an exact divisor of that number.
- Multiple :- A number is said to be a multiple of any of its factors.
- Even numbers :- All multiples of 2 are called even numbers.
Example :- 2,4,6,8,.....
- Odd numbers :- Numbers which are not multiples of 2 are called odd numbers.
Examples :- 1,3,5,7,.....
- Prime numbers :- Each of the numbers which have exactly two factors, namely one and itself, is called a prime number. Example :- 2,3,5,7,11,13,.....etc.
- Composite number :- Numbers having more than two factors are known as composite numbers. Example :- 4,6,8,9,10.....etc
- Twin primes :- Two consecutive odd prime numbers are known as twin primes.
Example:- [3,5] , [5,7] , [11,13].
- Prime Triplet :- A set of three consecutive prime numbers, differing by 2, is called a prime triplet. Example :- [3,5,7].
- Co-prime numbers :- Two numbers are said to be co-primes if they do not have a common factor other than one. Example :- [2,3] , [3,4] , [4,5].
- Important facts:-
 1. One is neither prime nor composite.
 2. Two is the lowest prime number.
 3. Two is the only even prime number.

CHAPTER - 2

FACTORS AND MULTIPLES

Note:- * This PDF contains only answers, for questions refer text book [R.S. Aggarwal].

* Remaining questions do as Homework.

EXERCISE – 2 'A'

1. Define: (i) factor (ii) multiple. Give five examples of each.

Ans :-Factor: The exact divisor of a number is known as a factor.

Example:- i) $6 = 1 \times 6$ and $6 = 2 \times 3$

Factors of 6 :- 1,2,3,6.

ii) $10 = 1 \times 10$ and $10 = 2 \times 5$

Factors of 10 :- 1,2,5,10.

iii) $14 = 1 \times 14$ and $14 = 2 \times 7$

Factors of 14:- 1,2,7,14.

iv) $15 = 1 \times 15$ and $15 = 3 \times 5$

Factors of 15 :- 1,3,5,15.

v) $18 = 1 \times 18$, 2×9 , 3×6 .

Factors of 18 :- 1,2,3,6,9,18.

Multiple: A number obtained by multiplying it by natural number is known as multiple

Example:- $7 \times 1 = 7$, $7 \times 2 = 14$, $7 \times 3 = 21$, $7 \times 4 = 28$, $7 \times 5 = 35$.

2. Write down all the factors of

(i) 20 (ii) 36 (iii) 60 (iv) 75

Ans:-(i) 20

$$20 = 1 \times 20$$

$$20 = 4 \times 5$$

$$20 = 10 \times 2$$

Hence the factors are 1, 2, 4, 5, 10 and 20

(ii) 36

$$36 = 1 \times 36$$

$$36 = 6 \times 6$$

$$36 = 9 \times 4$$

$$36 = 12 \times 3$$

$$36 = 18 \times 2$$

Hence the factors are 1, 2, 3, 4, 6, 9,12,18 and 36

(iii) 60

$$60 = 1 \times 60$$

$$60 = 10 \times 6$$

$$60 = 30 \times 2$$

$$60 = 15 \times 4$$

$$60 = 12 \times 5$$

$$60 = 3 \times 20$$

Hence the factors are 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 and 60

(iv) 75

$$75 = 1 \times 75$$

$$75 = 3 \times 25$$

$$75 = 5 \times 15$$

Hence the factors are 1, 3, 5, 15, 25 and 75.

3. Write the first five multiples of each of the following numbers:

(i) 17

(ii) 23

(iii) 65

(iv) 70

Ans :-(i) 17

$$17 \times 1 = 17$$

$$17 \times 2 = 34$$

$$17 \times 3 = 51$$

$$17 \times 4 = 68$$

$$17 \times 5 = 85$$

$\therefore$ The first five multiples of 17 are 17, 34, 51, 68 and 85

(ii) 23

$$23 \times 1 = 23$$

$$23 \times 2 = 46$$

$$23 \times 3 = 69$$

$$23 \times 4 = 92$$

$$23 \times 5 = 115$$

$\therefore$ The first five multiples of 23 are 23, 46, 69, 92 and 115

(iii) 65

$$65 \times 1 = 65$$

$$65 \times 2 = 130$$

$$65 \times 3 = 195$$

$$65 \times 4 = 260$$

$$65 \times 5 = 325$$

∴ The first five multiples of 65 are 65, 130, 195, 260 and 325

(iv) 70

$$70 \times 1 = 70$$

$$70 \times 2 = 140$$

$$70 \times 3 = 210$$

$$70 \times 4 = 280$$

$$70 \times 5 = 350$$

∴ The first five factors are 70, 140, 210, 280 and 350.

4. Which of the following numbers are even and which are odd?

(i) 32 (ii) 37 (iii) 50 (iv) 58

(v) 69 (vi) 144 (vii) 321 (viii) 253

Ans:- Even numbers :- 32, 50, 58, 144.

Odd numbers:- 37, 69, 321, 253.

5. What are prime numbers? Give ten examples.

Ans:- A number which has only two factors namely 1 and itself is called as prime numbers

Examples: 2, 3, 5, 7, 11, 13, 17, 19, 23 and 29 are prime numbers.

6. Write all the prime numbers between

(i) 10 and 40 (ii) 80 and 100 (iii) 40 and 80 (iv) 30 and 40

Ans:- (i) 11, 13, 17, 19, 23, 29, 31 and 37 are all prime numbers between 10 and 40

(ii) 83, 89 and 97 are all prime numbers between 80 and 100

(iii) 41, 43, 47, 53, 59, 61, 67, 71, 73 and 79 are all prime numbers between 40 and 80

(iv) 31 and 37 are prime numbers between 30 and 40

7. (i) Write the smallest prime number.

(ii) List all even prime numbers.

(iii) Write the smallest odd prime number.

Ans:-(i) 2 is the smallest prime number.

(ii) 2 is only one even prime number.

(iii) 3 is the smallest odd prime number.

8. Find which of the following prime numbers are primes:

(i) 87 (ii) 89 (iii) 63 (iv) 91

Ans:- Out of the given numbers 89 is a prime number.

9. Make a list of seven consecutive numbers, none of which is prime.

Ans:-The seven consecutive numbers are 90, 91, 92, 93, 94, 95 and 96 which are not prime numbers.

10. (i) Is there any counting number having no factor at all?

(ii) Find all the numbers having exactly one factor.

(iii) Find numbers between 1 and 100 having exactly three factors.

Ans:- (i) Since every number has two factors i.e. 1 and itself .Hence there are no counting number having no factor at all.

(ii) There is only one number which has exactly 1 factor i.e. is 1.

(iii) 4 , 9 , 25 and 49 are the numbers between 1 and 100 having exactly three factors.

11. What are composite numbers? Can a composite number be odd? If yes write the smallest odd composite number.

Ans:- Composite numbers are numbers having more than two factors.

Yes, there are odd composite numbers and 9 is the smallest odd composite number.

12. What are twin primes? Write all the pairs of twin primes between 50 and 100.

Ans:- Two consecutive prime numbers are known as twin primes.

(59,61) , (71,73)

13. What are co- primes? Give examples of five pairs of co- primes. Are co-primes always primes? If no, illustrate your answer by an example.

Ans:- Two numbers are said to be the co- prime if they have no common factor other than one. Example:- (2,3) , (3,5) , (4,7) , (21,25) , (5,6) are co-primes. It is not necessary that co-primes should always be prime. Example:- (21,25) are co-primes.

EXERCISE- 2 'B'

1. Test the divisibility of the following numbers by 2:

- (i) 2650 (ii) 69435 (iii) 59628
(iv) 789403 (v) 357986 (vi) 367314

Ans:-A number is divisible by 2 only if its ones digit is 0, 2, 4, 6 and 8

(i) Since 0 is in one's digits place in 2650

∴ It is divisible by 2

(ii) Since 0, 2, 4, 6 or 8 is not in ones digits place in 69435

∴ It is not divisible by 2

(iii) Since 8 is in ones digits place in 59628

∴ It is divisible by 2

(iv) Since 0, 2, 4, 6, or 8 is not in ones digits place in 789403

∴ It is not divisible by 2

(v) Since 6 is in ones digits place in 357986

∴ It is divisible by 2

(vi) Since 4 is in ones digits place in 367314

∴ It is divisible by 2

2. Test the divisibility of the following numbers by 3

- (i) 733 (ii) 10038 (iii) 20701
(iv) 524781 (v) 79124 (vi) 872645

Ans:- A number is divisible by 3 when sum of its digits is divisible by 3

(i) Sum of its digits = $7 + 3 + 3 = 13$

Since 13 is not divisible by 3

∴ 733 is not divisible by 3

(ii) Sum of its digits = $1 + 0 + 0 + 3 + 8 = 12$

Since 12 is divisible by 3

∴ 10038 is divisible by 3

(iii) Sum of its digits = $2 + 0 + 7 + 0 + 1 = 10$

Since 10 is not divisible by 3

$\therefore$ 20701 is not divisible by 3

(iv) Sum of its digits = $5 + 2 + 4 + 7 + 8 + 1 = 27$

Since 27 is divisible by 3

$\therefore$ 524781 is divisible by 3

(v) Sum of its digits = $7 + 9 + 1 + 2 + 4 = 23$

Since 23 is not divisible by 3

$\therefore$ 79124 is not divisible by 3

(vi) Sum of its digits $8 + 7 + 2 + 6 + 4 + 5 = 32$

Since 32 is not divisible by 3

$\therefore$ 872645 is not divisible by 3

3. Test the divisibility of the following numbers by 4

(i) 618

(ii) 2314

(iii) 63712

(iv) 35056

(v) 946126

(vi) 810524

Ans:- A number is divisible by 4 if the digits in its ones and tens place are divisible by 4

1) 618 is not divisible by 4 since the last two digits 18 is not divisible by 4

2) 2314 is not divisible by 4 since last two digits is 14 is not divisible by 4

3) 63712 is divisible by 4 since last two digits 12 is divisible by 4

4) 35056 is divisible by 4 since last two digits 56 is divisible by 4

5) 946126 is not divisible by 4 since last two digits 26 is not divisible by 4

6) 810524 is divisible by 4 since last two digits 24 is divisible by 4

4. Test the divisibility of the following numbers by 5:

(i) 4965

(ii) 23590

(iii) 35208

(iv) 723405

(v) 124684

(vi) 438750

Ans:- If the ones digit of a number is 0 or 5 then the number is divisible by 5

(i) Since 5 is in ones place

$\therefore$ 4965 is divisible by 5

(ii) Since 0 is in ones place

$\therefore$ 23590 is divisible by 5

(iii) Since 8 is in ones place

$\therefore$ 35208 is not divisible by 5

(iv) Since 5 is in ones place

$\therefore$ 723405 is divisible by 5

(v) Since 4 is in ones place

$\therefore$ 124684 is not divisible by 5

(vi) Since 0 is in ones place

$\therefore$ 438750 is divisible by 5

5. Test the divisibility of the following numbers by 6:

(i) 2070

(ii) 46523

(iii) 71232

(iv) 934706

(v) 251780

(vi) 872536

Ans:- If the number is divisible by both 2 and 3 then the number is divisible by 6

(i) Divisibility by 2 = Since 0 is in ones place. It is divisible by 2

Divisibility by 3 = Since the sum of digits = $2 + 0 + 7 + 0 = 9$

9 is divisible by 3

$\therefore$ 2070 is divisible by 6

(ii) Divisibility by 2 = Since 3 is in ones place it is not divisible by 2

$\therefore$ 46523 is not divisible neither by 2 or 6

(iii) Divisibility by 2 = Since 2 is in ones place it is divisible by 2

Divisibility by 3 = The sum of its digits = $7 + 1 + 2 + 3 + 2 = 15$

15 is divisible by 3

$\therefore$ 71232 is divisible by 6 as it is divisible by 2 and 3

(iv) Divisibility by 2 = since sum of digits = $9 + 3 + 4 + 7 + 0 + 6 = 29$

29 is not divisible by 3

$\therefore$ 934706 is not divisible by 6

(v) Divisibility by 3 = since sum of digits = $2 + 5 + 1 + 7 + 8 + 0 = 23$

23 is not divisible by 3

$\therefore$ 251780 is not divisible by 6

(vi) Divisibility by 3 = since sum of digits = $8 + 7 + 2 + 5 + 3 + 6 = 31$

31 is not divisible by 3

$\therefore$ 872536 is not divisible by 6

6. Test the divisibility of the following numbers by 7:

(i) 826

(ii) 117

(iii) 2345

(iv) 6021

(v) 14126

(vi) 25368

Ans:- To find out the number is divisible by 7, the last digit of the number is doubled and subtracted from the number formed by remaining digits. If the difference is multiple by 7 then its divisible by 7

(i) 826

$$82 - 2 \times 6 = 70$$

70 is a multiple of 7

$\therefore$ 826 is divisible by 7

(ii) 117

$$11 - 2 \times 7 = -3$$

-3 is not multiple of 7

$\therefore$ 117 is not divisible by 7

(iii) 2345

$$234 - 2 \times 5 = 224$$

224 is a multiple of 7

$\therefore$ 2345 is divisible by 7

(iv) 6021

$$602 - 2 \times 1 = 600$$

600 is not multiple of 7

$\therefore$ 6021 is not divisible by

(v) 14126

$$1412 - 2 \times 6 = 1400$$

1400 is a multiple of 7

$\therefore$ 14126 is divisible by 7

(vi) 25368

$$2536 - 2 \times 8 = 2520$$

2520 is a multiple of 7

$\therefore$ 25368 is divisible by 7

7. Test the divisibility of the following numbers by 8:

(i) 9364

(ii) 2138

(iii) 36792

(iv) 901674

(v) 136976

(vi) 1790184

Ans:- If the number formed by the last three digits is divisible by 8 then the given number is divisible by 8

(i) 9364

364 is not divisible by 8

Hence 9364 is not divisible by 8

(ii) 2138

138 is not divisible by 8

Hence 2138 is not divisible by 8

(iii) 36792

792 is divisible by 8

Hence 36792 is divisible by 8

(iv) 901674

674 is not divisible by 8

Hence 901674 is not divisible by 8

(v) 136976

976 is divisible by 8

Hence 136976 is divisible by 8

(vi) 1790184

184 is divisible by 8

Hence 1790184 is divisible by 8.

8. Test the divisibility of the following numbers by 9:

(i) 2358 (ii) 3333 (iii) 98712

(iv) 257106 (v) 647514 (vi) 326999

Ans;- If the sum of its digits is divisible by 9 then the given number is divisible by 9

(i) 2358

Sum of its digits = $2 + 3 + 5 + 8 = 18$

18 is divisible by 9

Hence 2358 is divisible by 9

(ii) 3333

Sum of its digits = $3 + 3 + 3 + 3 = 12$

12 is not divisible by 9

Hence 3333 is not divisible by 9

(iii) 98712

Sum of its digits = $9 + 8 + 7 + 1 + 2 = 27$

27 is divisible by 9

Hence 98712 is divisible by 9

(iv) 257106

Sum of its digits = $2 + 5 + 7 + 1 + 0 + 6 = 21$

21 is not divisible by 9

Hence 257106 is not divisible by 9

(v) 647514

Sum of its digits = $6 + 4 + 7 + 5 + 1 + 4 = 27$

27 is divisible by 9

Hence 647514 is divisible by 9

(vi) 326999

Sum of its digits = $3 + 2 + 6 + 9 + 9 + 9 = 38$

38 is not divisible by 9

Hence 326999 is not divisible by 9

9. Test the divisibility of the following numbers by 10:

(i) 5790 (ii) 63215 (iii) 55555

Ans:-If the ones digit of a number is 0 then the given number is divisible by 10

(i) 5790

Here the ones digit is 0

$\therefore$ 5790 is divisible by 10

(ii) 63215

Here the ones digit is 5

$\therefore$ 63215 is not divisible by 10

(iii) 55555

Here the ones digit is 5

$\therefore$ 55555 is not divisible by 10

10. Test the divisibility of the following numbers by 11:

(i) 4334 (ii) 83721 (iii) 66311
(iv) 137269 (v) 901351 (vi) 8790322

Ans:-If the difference of the sum of its digits at odd places and sum of its digits at even places is either 0 or multiple of 11 then the given number is divisible by 11

(i) 4334

Sum of the digits at odd places = $4 + 3 = 7$

Sum of the digits at even places = $3 + 4 = 7$

Difference of the two sums = $7 - 7 = 0$

$\therefore$ 4334 is divisible by 11

(ii) 83721

Sum of the digits at odd places = $1 + 7 + 8 = 16$

Sum of the digits at even places = $2 + 3 = 5$

Difference of the two sums = $16 - 5 = 11$

$\therefore$ 83721 is divisible by 11

(iii) 66311

Sum of the digits at odd places = $1 + 3 + 6 = 10$

Sum of the digits at even places = $1 + 6 = 7$

Difference of the two sums = $10 - 7 = 3$

$\therefore$ 66311 is not divisible by 11

(iv) 137269

Sum of the digits at odd places = $9 + 2 + 3 = 14$

Sum of the digits at even places = $6 + 7 + 1 = 14$

Difference of the two sums = $14 - 14 = 0$

$\therefore$ 137269 is divisible by 11

(v) 901351

Sum of the digits at odd places = $0 + 3 + 1 = 4$

Sum of the digits at even places = $9 + 1 + 5 = 15$

Difference of the two sums = $4 - 15 = -11$

$\therefore$ 901351 is divisible by 11

(vi) 8790322

Sum of the digits at odd places = $2 + 3 + 9 + 8 = 22$

Sum of the digits at even places = $2 + 0 + 7 = 9$

Difference of the two sums = $22 - 9 = 13$

$\therefore$ 8790322 is not divisible by 11

11. In each of the following numbers, replace * by the smallest number to make it divisible by 3:

(i) $27 * 4$

(ii) $53 * 46$

(iii) $8 * 711$

Ans:- (i) $27 * 4$

Sum of its digits = $2 + 7 + 4 = 13$.

The number next to 13, which is divisible by 3 is 15.

$\therefore$ Required smallest number = $15 - 13 = 2$.

(ii) $53 * 46$

Sum of its digits = $5 + 3 + 4 + 6 = 18$.

Which is divisible by 3 .

$\therefore$ Required smallest number = 0.

(iii) $8 * 711$

Sum of its digits = $8 + 7 + 1 + 1 = 17$.

The number next to 17, which is divisible by 3 is 18.

$\therefore$ Required smallest number = $18 - 17 = 1$.

12. In each of the following numbers, replace * by the smallest number to make it divisible by 9.

(i) $65 * 5$

(ii) $2 * 135$

(iii) $6702 *$

Ans:- Sum of its digits = $6 + 5 + 5 = 16$.

The number next to 16, which is divisible by 9 is 18.

$\therefore$ Required smallest number = $18 - 16 = 2$.

(ii) $2 * 135$

Sum of its digits = $2 + 1 + 3 + 5 = 11$.

The number next to 11, which is divisible by 9 is 18.

$\therefore$ Required smallest number = $18 - 11 = 7$.

(iii) $6702 *$

Sum of its digits = $6 + 7 + 0 + 2 = 15$.

The number next to 15, which is divisible by 9 is 18.

$\therefore$ Required smallest number = $18 - 15 = 3$.

13. In each of the following numbers, replace * by the smallest number to make it divisible by 11:

- (i) $26 * 5$ (ii) $39 * 43$

Ans:- (i) $26 * 5$

Sum of its digit is odd places = $5 + 6 = 11$.

Sum of its digit in even place = $* + 2$.

Difference of the sums = $11 - (* + 2)$.

$$\therefore 11 - (* + 2) = 0$$

$$11 = * + 2$$

$$11 - 2 = *$$

$$9 = *$$

The required smallest number is 9.

- (ii) $39 * 43$

Sum of its digit is odd places = $3 + * + 3 = (6 + *)$.

Sum of its digit in even place = $4 + 9 = 13$.

Difference of the sums = $13 - (6 + *)$.

$$\therefore 13 - 6 - * = 0$$

$$7 - * = 0$$

$$7 = *$$

The required smallest number is 7.

EXERCISE – 2 'C'

Give the prime factorization of each of the following numbers:

- (i) 12

Ans:-

We have

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

$$\therefore 12 = 2 \times 2 \times 3 = 2^2 \times 3.$$

(ii) 18

Ans:-

We have

$$\begin{array}{r|l} 2 & 18 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\therefore 18 = 2 \times 3 \times 3 = 2 \times 3^2$$

(iv) 56

We have

$$\begin{array}{r|l} 2 & 56 \\ \hline 2 & 28 \\ \hline 2 & 14 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$\begin{aligned} \therefore 56 &= 2 \times 2 \times 2 \times 7 \\ &= 2^3 \times 7. \end{aligned}$$

(v) 90

Ans:-

We have

$$\begin{array}{r|l} 2 & 90 \\ \hline 3 & 45 \\ \hline 3 & 15 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$\begin{aligned} \therefore 90 &= 2 \times 3 \times 3 \times 5 \\ &= 2 \times 3^2 \times 5. \end{aligned}$$

(ix) 637

Ans:-

We have

$$\begin{array}{r|l} 7 & 637 \\ \hline 7 & 91 \\ \hline 13 & 13 \\ \hline & 1 \end{array}$$

$$\begin{aligned} \therefore 637 &= 7 \times 7 \times 13 \\ &= 7^2 \times 13. \end{aligned}$$

(x) 945

Ans:- We have

$$\begin{array}{r|l} 3 & 945 \\ \hline 3 & 315 \\ \hline 3 & 105 \\ \hline 5 & 21 \\ \hline 7 & 3 \\ \hline & 1 \end{array}$$

$$\begin{aligned} \therefore 945 &= 3 \times 3 \times 3 \times 5 \times 7 \\ &= 3^3 \times 5 \times 7. \end{aligned}$$

(xi) 1224

Ans:- We have

$$\begin{array}{r|l} 2 & 1224 \\ \hline 2 & 612 \\ \hline 2 & 306 \\ \hline 3 & 153 \\ \hline 3 & 51 \\ \hline 17 & 3 \\ \hline & 1 \end{array}$$

$$\begin{aligned} \therefore 1224 &= 2 \times 2 \times 2 \times 3 \times 3 \times 17 \\ &= 2^3 \times 3^2 \times 17. \end{aligned}$$

EXERCISE – 2'D'

Find the HCF of the numbers in each of the following, using the prime factorization method:

(ii) 170, 238

Ans:- We have

$$\begin{array}{r|l} 2 & 170 \\ \hline 5 & 85 \\ \hline 17 & 17 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 238 \\ \hline 7 & 119 \\ \hline 17 & 17 \\ \hline & 1 \end{array}$$

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

$$238 = 2 \times 7 \times 17$$

$$\therefore \text{H.C.F. of 170 and 238} = 2 \times 17 = 34$$

(v) 84, 120, 138

Ans:- We have

$$\begin{array}{r} 2 \overline{)84} \\ 2 \overline{)42} \\ 3 \overline{)21} \\ 7 \overline{)7} \\ \hline 1 \end{array} \quad \begin{array}{r} 2 \overline{)120} \\ 2 \overline{)60} \\ 2 \overline{)30} \\ 3 \overline{)15} \\ 5 \overline{)5} \\ \hline 1 \end{array} \quad \begin{array}{r} 2 \overline{)138} \\ 3 \overline{)69} \\ 23 \overline{)23} \\ \hline 1 \end{array}$$

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

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

$$138 = 2 \times 3 \times 23$$

$$\therefore \text{H.C.F. of } 84, 120 \text{ and } 138 = 2 \times 3 = 6$$

(viii) 144, 252, 630

Ans:- We have

$$\begin{array}{r} 2 \overline{)144} \\ 2 \overline{)72} \\ 2 \overline{)36} \\ 2 \overline{)18} \\ 3 \overline{)9} \\ 3 \overline{)3} \\ \hline 1 \end{array} \quad \begin{array}{r} 2 \overline{)252} \\ 2 \overline{)126} \\ 3 \overline{)63} \\ 3 \overline{)21} \\ 7 \overline{)7} \\ \hline 1 \end{array} \quad \begin{array}{r} 2 \overline{)630} \\ 3 \overline{)315} \\ 3 \overline{)105} \\ 5 \overline{)35} \\ 7 \overline{)7} \\ \hline 1 \end{array}$$

$$\text{So, } 144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 2^4 \times 3^2$$

$$252 = 2 \times 2 \times 3 \times 3 \times 7 = 2^2 \times 3^2 \times 7$$

$$630 = 2 \times 3 \times 3 \times 5 \times 7 = 2 \times 3^2 \times 5 \times 7$$

$$\therefore \text{H.C.F. of } 144, 252 \text{ and } 630 = 2 \times 3^2$$

$$= 2 \times 9 = 18.$$

Find the HCF of the numbers in each of the following, using the division method:

(x) 58, 70

Ans:- By division method, we have :

$$\begin{array}{r} 58 \overline{)70} (1 \\ \underline{58} \\ 12 \overline{)58} (4 \\ \underline{48} \\ 10 \overline{)12} (1 \\ \underline{10} \\ 2 \overline{)10} (5 \\ \underline{10} \\ \hline \end{array}$$

$$\therefore \text{H.C.F. of } 58 \text{ and } 70 = 2.$$

(xiii) 1965, 2096

Ans:- By division method, we have

$$\begin{array}{r} 1965 \overline{) 2096} \quad (1 \\ \underline{1965} \\ 131 \overline{) 1965} \quad (15 \\ \underline{131} \\ 655 \\ \underline{655} \\ \times \end{array}$$

$\therefore$ H.C.F. of 1965 and 2096 = 131

(xvi) 754, 1508, 1972

Ans:-

First, we find the H.C.F. of 754 and 1508

$$\begin{array}{r} 754 \overline{) 1508} \quad (2 \\ \underline{1508} \\ \times \end{array}$$

$\therefore$ H.C.F. of 754 and 1508 is 754

Now, we find the H.C.F. of 754 and 1972

$$\begin{array}{r} 754 \overline{) 1972} \quad (2 \\ \underline{1508} \\ 464 \overline{) 754} \quad (1 \\ \underline{464} \\ 290 \overline{) 464} \quad (1 \\ \underline{290} \\ 174 \overline{) 290} \quad (1 \\ \underline{174} \\ 116 \overline{) 174} \quad (1 \\ \underline{116} \\ 58 \overline{) 116} \quad (2 \\ \underline{116} \\ \times \end{array}$$

$\therefore$ H.C.F. of 754 and 1972 = 58

Hence, the H.C.F. of 754, 1508 and 1972 = 58.

Show that the following pairs are co- primes:

(xix) 59, 97

Ans:-

First, we find the H.C.F. of 59, 97.

$$\begin{array}{r}
 59 \overline{) 97} (1 \\
 \underline{59} \\
 38 \\
 38 \overline{) 59} (1 \\
 \underline{38} \\
 21 \\
 21 \overline{) 38} (1 \\
 \underline{21} \\
 17 \\
 17 \overline{) 21} (1 \\
 \underline{17} \\
 4 \\
 4 \overline{) 17} (4 \\
 \underline{16} \\
 1 \\
 1 \overline{) 4} (4 \\
 \underline{4} \\
 0
 \end{array}$$

∴ H.C.F. of 59 and 97 is 1.

Hence 59 and 97 are co-prime.

(xxii) 512, 945

Ans:-

First, we find the H.C.F. of 512 and 945.

$$\begin{array}{r}
 512 \overline{) 945} (1 \\
 \underline{512} \\
 433 \\
 433 \overline{) 512} (1 \\
 \underline{433} \\
 79 \\
 79 \overline{) 433} (5 \\
 \underline{395} \\
 38 \\
 38 \overline{) 79} (2 \\
 \underline{76} \\
 3 \\
 3 \overline{) 38} (12 \\
 \underline{36} \\
 2 \\
 2 \overline{) 3} (1 \\
 \underline{2} \\
 1 \\
 1 \overline{) 2} (2 \\
 \underline{2} \\
 0
 \end{array}$$

∴ H.C.F. of 512 and 945 is 1.

Hence 512 and 945 are co-prime.

(xxv) Find the greatest number which divides 615 and 963, leaving the remainder 6 in each case.

Ans:- which divides $(615 - 6)$ and $(963 - 6)$ exactly.
So, the required number = H.C.F. of $615 - 6 = 609$ and $963 - 6 = 957$

$$\begin{array}{r}
 609 \overline{) 957} \quad (1 \\
 \underline{609} \\
 348 \\
 609 \overline{) 348} \quad (1 \\
 \underline{348} \\
 261 \\
 348 \overline{) 261} \quad (1 \\
 \underline{261} \\
 87 \\
 87 \overline{) 261} \quad (3 \\
 \underline{261} \\
 \hline
 \end{array}$$

The required greatest number = 87.

(xxvi) Find the greatest number which divides 2011 and 2623, leaving remainders 9 and 5 respectively.

Ans:- Clearly, we have to find the greatest number which divides $2011 - 9 = 2002$ and $2623 - 5 = 2618$.
So, the required greatest number = H.C.F. of 2002 and 2618

$$\begin{array}{r}
 2002 \overline{) 2618} \quad (1 \\
 \underline{2002} \\
 616 \\
 2002 \overline{) 616} \quad (3 \\
 \underline{1848} \\
 154 \\
 616 \overline{) 154} \quad (4 \\
 \underline{616} \\
 \hline
 \end{array}$$

$\therefore$ Required greatest number = 154.

(xxvii) Find the greatest number that will divide 445, 572 and 699, leaving remainders 4, 5, 6 respectively.

Ans:-

Clearly, we have to find the greatest number which divides $(445 - 4)$, $(572 - 5)$ and $(699 - 6)$.
So, the required number = H.C.F. of 441, 567 and 693. First we find the H.C.F. of 441 and 567

$$\begin{array}{r} 441 \overline{) 567} \quad 1 \\ \underline{441} \\ 126 \overline{) 567} \quad 4 \\ \underline{504} \\ 63 \overline{) 126} \quad 2 \\ \underline{126} \\ 0 \end{array}$$

$\therefore$ H.C.F. of 441 and 567 is 63

$$\text{Also, } 63 \overline{) 693} \quad 11 \\ \underline{63} \\ 63 \\ \underline{63} \\ 0$$

So H.C.F. of 63 and 693 is 63

Hence the required number = 63.

(xxx) Three different containers contains 403 L, 434 L and 465 L of milk respectively. Find the capacity of a container which can measure the milk of all the containers in an exact number of times.

Ans:-

Quantity of milk in three different containers = 403 L, 434 L and 465 L Clearly, the maximum capacity of the required container = H.C.F. of 403 L, 434 L, 465 L, we have

$$\begin{array}{r|rr} 13 & 403 & \\ \hline 31 & 31 & \\ \hline & 1 & \end{array} \quad \begin{array}{r|rr} 2 & 434 & \\ \hline 7 & 217 & \\ \hline 31 & 31 & \\ \hline & 1 & \end{array} \quad \begin{array}{r|rr} 5 & 465 & \\ \hline 3 & 93 & \\ \hline 31 & 31 & \\ \hline & 1 & \end{array}$$

$$\therefore 403 = 13 \times 31$$

$$434 = 2 \times 7 \times 31$$

$$465 = 5 \times 3 \times 31$$

So the H.C.F. of 403 L, 434 L and 465 L = 31 L

Maximum capacity of the required container = 31 L.

EXERCISE- 2 'E'

Find the LCM of given numbers given below:

1) 42, 63

Ans:-

We have

$$\begin{array}{r|rr} 2 & 42 & \\ 3 & 21 & \\ 7 & 7 & \\ \hline & 1 & \end{array}$$

$$\begin{array}{r|rr} 3 & 63 & \\ 3 & 21 & \\ 7 & 7 & \\ \hline & 1 & \end{array}$$

$$42 = 2 \times 3 \times 7$$

$$63 = 3 \times 3 \times 7$$

$$= 3^2 \times 7$$

$$\therefore \text{L.C.M. of 42 and 63} = 2 \times 3^2 \times 7$$

$$= 2 \times 9 \times 7$$

$$= 18 \times 7$$

$$= 126$$

2) 60, 75

Ans:-

We have

$$\begin{array}{r|rr} 2 & 60 & \\ 2 & 30 & \\ 3 & 15 & \\ 5 & 5 & \\ \hline & 1 & \end{array}$$

$$\begin{array}{r|rr} 3 & 75 & \\ 5 & 25 & \\ 5 & 5 & \\ \hline & 1 & \end{array}$$

$$\text{So, } 60 = 2 \times 2 \times 3 \times 5$$

$$= 2^2 \times 3 \times 5$$

$$75 = 3 \times 5 \times 5 = 3 \times 5^2$$

$$\therefore \text{L.C.M. of 60 and 75} = 2^2 \times 3 \times 5^2$$

$$= 4 \times 3 \times 25$$

$$= 4 \times 75 = 300$$

5) 36, 40, 126

Ans:-

We have

$$\begin{array}{r|rr}
 2 & 36 & \\
 2 & 18 & \\
 3 & 9 & \\
 3 & 3 & \\
 \hline
 & 1 &
 \end{array}
 \quad
 \begin{array}{r|rr}
 2 & 40 & \\
 2 & 20 & \\
 2 & 10 & \\
 5 & 5 & \\
 \hline
 & 1 &
 \end{array}
 \quad
 \begin{array}{r|rr}
 2 & 126 & \\
 3 & 63 & \\
 3 & 21 & \\
 7 & 7 & \\
 \hline
 & 1 &
 \end{array}$$

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

$$40 = 2 \times 2 \times 2 \times 5 = 2^3 \times 5$$

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

$\therefore$ L.C.M. of 36, 40 and 126 .

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

$$= 8 \times 9 \times 5 \times 7$$

$$= 72 \times 35$$

$$= 2520$$

7) 28, 36, 45, 60

Ans:-

$$\begin{array}{r|rrrr}
 2 & 28 & 36 & 45 & 60 \\
 2 & 14 & 18 & 45 & 30 \\
 3 & 7 & 9 & 45 & 15 \\
 3 & 7 & 3 & 15 & 5 \\
 5 & 7 & 1 & 5 & 5 \\
 \hline
 & 7 & 1 & 1 & 1
 \end{array}$$

$\therefore$ L.C.M. of given numbers = $2 \times 2 \times 3 \times 3 \times 5 \times 7$

$$= 36 \times 35$$

$$= 1260$$

Find the HCF and LCM of:

10) 117, 221

Ans:-

First we find the H.C.F. of the given numbers as under :

$$\begin{array}{r}
 117 \overline{) 221} \quad 1 \\
 \underline{117} \\
 104 \overline{) 117} \quad 1 \\
 \underline{104} \\
 13 \overline{) 104} \quad 8 \\
 \underline{104} \\
 \hline
 0
 \end{array}$$

$\therefore$ H.C.F. of 117 and 221 = 13

Now L.C.M. = $\frac{\text{product of numbers}}{\text{their H.C.F}}$

$$= \frac{117 \times 221}{13}$$

$$= 9 \times 221 = 1989$$

$\therefore$ H.C.F. = 13 and L.C.M. = 1989

11) 234 , 572

Ans:-

First we find the H.C.F. of 234 and 572 as under :

$$\begin{array}{r} 234 \overline{) 572} \quad (2 \\ \underline{468} \\ 104 \overline{) 234} \quad (2 \\ \underline{208} \\ 26 \overline{) 104} \quad (4 \\ \underline{104} \\ \hline \end{array}$$

H.C.F. of 234 and 572 = 26

$$\begin{aligned} \text{Now L.C.M.} &= \frac{\text{product of numbers}}{\text{their H.C.F}} \\ &= \frac{234 \times 572}{26} \\ &= 9 \times 572 \\ &= 5148 \end{aligned}$$

17) The product of two number is 2160 and their HCF is 12. Find their LCM.

Ans:-

We know that

$$\begin{aligned} \text{L.C.M} &= \frac{\text{product of the number}}{\text{their H.C.F}} \\ &= \frac{2160}{12} \\ &= 180 \end{aligned}$$

18) The product of two numbers is 2560 and their LCM is 320. Find their HCF.

Ans:-

We know that

$$\begin{aligned} \text{L.C.M} &= \frac{\text{product of the number}}{\text{their H.C.F}} \\ &= \frac{2560}{320} \\ &= 8 \end{aligned}$$

19) The HCF of two numbers is 145 and their LCM is 2175. If one of the numbers is 725, Find the other.

Ans:-

We know that

One number x The other number

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

∴ The other number

$$\begin{aligned} &= \frac{\text{H.C.F} \times \text{L.C.M}}{\text{One number}} \\ &= \frac{145 \times 2175}{725} \\ &= \frac{2175}{5} \end{aligned}$$

$$= 435$$

Required number = 435

20) The HCF and LCM of two numbers are 131 and 8253 respectively. If one of the numbers is 917, find the other.

Ans :-

We know that

One number x The other number

= H.C.F. x L.C.M.

The other number

$$= \frac{H.C.F \times L.C.M}{\text{One number}}$$

$$= \frac{131 \times 8253}{917}$$

$$= \frac{8253}{7}$$

Required number = 1179

EXERCISE – 2 'F'

Objective Questions:

1. Which of the following numbers is divisible by 3?

(a) 24357806 (b) 35769812 (c) 83479560 (d) 3336433

2. Which of the following numbers is divisible by 9?

(a) 8576901 (b) 96345210 (c) 67594310 (d) none of these

3. Which of the following numbers is divisible by 4?

(a) 78653234 (b) 98765042 (c) 24689602 (d) 87941032

4. Which of the following numbers is divisible by 8?

(a) 96354142 (b) 37450176 (c) 57064214 (d) none of these

5. Which of the following numbers is divisible by 6?

(a) 8790432 (b) 98671402 (c) 85492014 (d) none of these

6. Which of the following numbers is divisible by 11?

(a) 3333333 (b) 1111111 (c) 2222222 (d) none of these

7. Which of the following is a prime number?

(a) 81 (b) 87 (c) 91 (d) 97

8. Which of the following is a prime number?

(a) 117 (b) 171 (c) 179 (d) none of these

9. Which of the following is a prime number?

(a) 323 (b) 361 (c) 263 (d) none of these

10 Which of the following are co-primes?

(a) 8, 12 (b) 9, 10 (c) 6, 8 (d) 15, 18

THANK YOU.



