Rs Aggrawal 2019 2020 for Class 6 Math Chapter 2 - Factors And Multiples

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Question 1:

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

ANSWER:

Factor: A factor of a number is an exact divisor of that number.
Multiple: A multiple of a number is a number obtained by multiplying it by a natural number.

Example 1: We know that 15 = 1 × 15 and 15 = 3 × 5

∴ 1, 3, 5 and 15 are the factors of 15.
In other words, we can say that 15 is a multiple of 1, 3, 5 and 15.

Example 2: We know that 8 = 8 × 1, 8 = 2 × 4 and 8 = 4 × 2

∴ 1, 2, 4 and 8 are the factors of 8.
In other words, we can say that 8 is a multiple of 1, 2, 4 and 8.

Example 3: We know that 30 = 30 × 1, 30 = 5 × 6 and 30 = 6 × 5

∴ 1, 5, 6 and 30 are factors of 30.
In other words, we can say that 30 is a multiple of 1, 5, 6 and 30.

Example 4: We know that 20 = 20 × 1, 20 = 4 × 5 and 20 = 5 × 4

∴ 1, 4, 5 and 20 are factors of 20.
In other words, we can say that 20 is a multiple of 1, 4, 5 and 20.

Example 5: We know that 10 = 10 × 1, 10 = 2 × 5 and 10 = 5 × 2

∴ 1, 2, 5 and 10 are factors of 10.
In other words, we can say that 10 is a multiple of 1, 2, 5 and 10.

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Question 2:

Write down all the factors of
(i) 20
(ii) 36
(iii) 60
(iv) 75

ANSWER:

(i) 20
20 = 1 × 20; 20 = 10 × 2 and 20 = 4 × 5
The factors of 20 are 1, 2, 4, 5, 10 and 20.

(ii) 36
36 = 1 × 36; 36 = 2 × 18; 36 = 3 × 12 and 36 = 4 × 9
The factors of 36 are 1, 2, 3, 4, 6, 9, 12 and 36.

(iii) 60
60 = 1 × 60; 60 = 2 × 30; 60 = 3 × 20; 60 = 4 × 15 and 60 = 5 × 12
The factors of 60 are 1, 2, 3, 4, 5, 6, 10, 12, 15 and 60.

(iv) 75
75 = 1 × 75; 75 = 3 × 25 and 75 = 5 × 15
The factors of 75 are 1, 3, 5, 15, 25 and 75.

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Question 3:

Write the first five multiples of each of the following numbers:
(i) 17
(ii) 23
(iii) 65
(iv) 70

ANSWER:

(i) 17
17 × 1 = 17; 17 × 2 = 34; 17 × 3 = 51; 17 × 4 = 68 and 17 × 5 = 85
∴ The first five multiples of 17 are 17, 34, 51, 68 and 85.

(ii) 23
23 × 1=23; 23 × 2 = 46; 23 × 3 = 69; 23 × 4 = 92 and 23 × 5 = 115
∴ The first five multiples of 23 are 23, 46, 69, 92 and 115.

(iii) 65
65 × 1 = 65; 65 × 2 = 130; 65 × 3 = 195; 65 × 4 = 260 and 65 × 5 = 325
∴ The first five multiples of 65 are 65, 130, 195, 260 and 325.

(iv) 70
70 × 1=70; 70 × 2 = 140; 70 × 3 = 210; 70 × 4 = 280 and 70 × 5 = 350
∴ The first five multiples of 70 are 70, 140, 210, 280 and 350.

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Question 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

ANSWER:

(i) 32
Since 32 is a multiple of 2, it is an even number.
(ii) 37
Since 37 is not a multiple of 2, it is an odd number.
(iii) 50
Since 50 is a multiple of 2, it is an even number.
(iv) 58
Since 58 is a multiple of 2, it is an even number.
(v) 69
Since 69 is not a multiple of 2, it is an odd number.
(vi) 144
Since 144 is a multiple of 2, it is an even number.
(vii) 321
Since 321 is not a multiple of 2, it is an odd number.
(viii) 253
Since 253 is not a multiple of 2, it is an odd number.

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Question 5:

What are prime numbers? Give ten examples.

ANSWER:

Prime number: A number is called a prime number if it has only two factors, namely 1 and itself .

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

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Question 6:

Write all the prime numbers between
(i) 10 and 40
(ii) 80 and 100
(iii) 40 and 80
(iv) 30 and 40

ANSWER:

(i) All prime numbers between 10 and 40 are 11, 13, 17, 19, 23, 29, 31 and 37.
(ii) All prime numbers between 80 and 100 are 83, 89 and 97.
(iii) All prime numbers between 40 and 80 are 41, 43, 47, 53, 59, 61, 67, 71, 73 and 79.
(iv) All prime numbers between 30 and 40 are 31 and 37.

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Question 7:

(i) Write the smallest prime number.
(ii) List all even prime numbers.
(iii) Write the smallest odd prime number.

ANSWER:

(i) The smallest prime number is 2.
(ii) There is only one even prime number, i.e., 2.
(iii) The smallest odd prime number is 3.

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Question 8:

Find which of the following numbers are primes:
(i) 87
(ii) 89
(iii) 63
(iv) 91

ANSWER:

(i) 87
The divisors of 87 are 1, 3, 29 and 87 i.e. 87 has more than 2 factors. Therefore 87 is not a prime number.

(ii) 89
The divisors of 89 are 1 and 89. Therefore 89 is a prime number.

(iii) 63
The divisors of 63 are 1, 3, 7, 9, 21 and 63 i.e. 63 has more than 2 factors. Therefore 63 is not a prime number.

(iv) 91
The divisors of 91 are 1, 7, 13 and 91 i.e. 91 has more than 2 factors. Therefore 91 is not a prime number.

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Question 9:

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

ANSWER:

90, 91, 92, 93, 94, 95 and 96 are seven consecutive numbers and none of them is a prime.

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Question 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.

ANSWER:

(i) No, there are no counting numbers with no factors at all because every number has at least two factors, i.e., 1 and itself.
(ii) There is only one number that has exactly one factor, i.e, 1.
(iii) The numbers between 1 and 100 that have exactly three factors are 4, 9, 25 and 49.

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Question 11:

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

ANSWER:

The numbers that have more than two factors are known as composite numbers.
Yes, a composite number can be odd.
The smallest odd composite number is 9.

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Question 12:

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

ANSWER:

Two consecutive odd prime numbers are called twin primes.
The pairs of twin primes between 50 to 100 are (59, 61) and (71, 73).

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Question 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.

ANSWER:

If two numbers do not have a common factor other than 1, they are said to be co-primes.

Five pairs of co primes: (i) 2 and 3 (ii) 3 and 4 (iii) 4 and 5 (iv) 4 and 9 (v) 8 and 15

No, co–primes are not always primes.

For example, 3 and 4 are co-prime numbers, where 3 is a prime number and 4 is not a prime number.

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Question 14:

Express each of the following numbers as the sum of two odd primes:
(i) 36
(ii) 42
(iii) 84
(iv) 98

ANSWER:

(i) 36
36 as the sum of two odd prime numbers is (36 = 31 + 5).
(ii) 42
42 as the sum of two odd prime numbers is (42 = 31 + 11).
(iii) 84
84 as the sum of two odd prime numbers is (84 = 41 + 43).
(iv) 98
98 as the sum of two odd prime numbers is (98 = 31 + 67).

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Question 15:

Express each of the following odd numbers as the sum of three odd prime numbers:
(i) 31
(ii) 35
(iii) 49
(iv) 63

ANSWER:

(i) 31
31 can be expressed as the sum of three odd prime numbers as (31 = 5 + 7 + 19).
(ii)) 35
35 can be expressed as the sum of three odd prime numbers as (35 = 17 + 13 + 5).
(iii) 49
49 can be expressed as the sum of three odd prime numbers as (49 = 13 + 17 + 19).
(iv) 63
63 can be expressed as the sum of three odd prime numbers as (63 = 29 + 31 + 3).

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Question 16:

Express each of the following numbers as the sum of twin primes:
(i) 36
(ii) 84
(iii) 120
(iv) 144

ANSWER:

(i) 36
36 can be expressed as the sum of twin primes as (36 = 17 + 19).
(ii) 84
84 can be expressed as the sum of twin primes as (84 = 41 + 43).
(iii) 120
120 can be expressed as the sum of twin primes as (120 = 59 + 61).
(iv) 144
144 can be expressed as the sum of twin primes as (144 = 71 + 73).

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Question 17:

Which of the following statements are true?
(i) 1 is the smallest prime number.
(ii) If a number is prime, it must be odd.
(iii) The sum of two prime numbers is always a prime number.
(iv) If two numbers are co-primes, at least one of them must be a prime number.

ANSWER:

(i) False. 2 is the smallest prime number.
(ii) False. 2 is an even prime number.
(iii) False. 3 and 7 are two prime numbers and their sum is 10, which is even.
(iv) False. 4 and 9 are co-primes but neither of them is a prime number.

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Question 1:

Test the divisibility of the following numbers by 2:
(i) 2650
(ii) 69435
(iii) 59628
(iv) 789403
(v) 357986
(vi) 367314

ANSWER:

A number is divisible by 2 if its ones digit is 0, 2, 4, 6 or 8.
(i) Since the digit in the ones place in 26250 is 0, it is divisible by 2
(ii) Since the digit in the ones place in 69435 is not 0, 2, 4, 6 or 8, it is not divisible by 2.
(iii) Since the digit in the ones place in 59628 is 8, it is divisible by 2.
(iv) Since the digit in the ones place in 789403 is not 0, 2, 4, 6, or 8, it is not divisible by 2.
(v) Since the digit in the ones place in 357986 is 6, it is divisible by 2.
(vi) Since the digit in the ones place in 367314 is 4, it is divisible by 2.

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Question 2:

Test the divisibility of the following numbers by 3:
(i) 733
(ii) 10038
(iii) 20701
(iv) 524781
(v) 79124
(vi) 872645

ANSWER:

A number is divisible by 3 if the sum of its digits is divisible by 3.
(i) 733 is not divisible by 3 because the sum of its digits, 7 + 3 + 3, is 13, which is not divisible by 3.
(ii) 10038 is divisible by 3 because the sum of its digits, 1 + 0 + 0 + 3 + 8, is 12, which is divisible by 3.
(iii) 20701 is not divisible by 3 because the sum of its digits, 2 + 0 + 7 + 0 + 1, is 10, which is not divisible by 3.
(iv) 524781 is divisible by 3 because the sum of its digits, 5 + 2 + 4 + 7 + 8 + 1, is 27, which is divisible by 3.
(v) 79124 is not divisible by 3 because the sum of its digits, 7 + 9 + 1 + 2 + 4, is 23, which is

not divisible by 3.
(vi) 872645 is not divisible by 3 because the sum of its digits, 8 + 7 + 2 + 6 + 4 + 5, is 32, which is not divisible by 3.

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Question 3:

Test the divisibility of the following numbers by 4:
(i) 618
(ii) 2314
(iii) 63712
(iv) 35056
(v) 946126
(vi) 810524

ANSWER:

A number is divisible by 4 if the number formed by the digits in its tens and units place is divisible by 4.

(i) 618 is not divisible by 4 because the number formed by its tens and ones digits is 18, which is not divisible by 4.
(ii) 2314 is not divisible by 4 because the number formed by its tens and ones digits is 14, which is not divisible by 4.
(iii) 63712 is divisible by 4 because the number formed by its tens and ones digits is 12, which is divisible by 4.
(iv) 35056 is divisible by 4 because the number formed by its tens and ones digits is 56, which is divisible by 4.
(v) 946126 is not divisible by 4 because the number formed by its tens and ones digits is 26, which is not divisible by 4.
(vi) 810524 is divisible by 4 because the number formed by its tens and ones digits is 24, which is divisible by 4.

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Question 4:

Test the divisibility of the following numbers by 5:
(i) 4965
(ii) 23590
(iii) 35208
(iv) 723405

(v) 124684
(vi) 438750

ANSWER:

A number is divisible by 5 if its ones digit is either 0 or 5.

(i) 4965 is divisible by 5, because the digit at its ones place is 5.

(ii) 23590 is divisible by 5, because the digit at its ones place is 0.

(iii) 35208 is not divisible by 5, because the digit at its ones place is 8.

(iv) 723405 is divisible by 5, because the digit at its ones place is 5.

(v) 124684 is not divisible by 5, because the digit at its ones place is 4.

(vi) 438750 is divisible by 5, because the digit at its ones place is 0.

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Question 5:

Test the divisibility of the following numbers by 6:
(i) 2070
(ii) 46523
(iii) 71232
(iv) 934706
(v) 251780
(vi) 872536

ANSWER:

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

i) Since 2070 is divisible by 2 and 3, it is divisible by 6.
Checking the divisibility by 2: Since the number 2070 has 0 in its units place, it is divisible by 2.
Checking the divisibility by 3: The sum of the digits of 2070, 2 + 0 + 7 + 0, is 9, which is divisible by 3. So, it is divisible by 3.

(ii) Since 46523 is not divisible by 2, it is not divisible by 6.

Checking the divisibility by 2: Since the number 46523 has 3 in its units place, it is not divisible by 2.

(iii) Since 71232 is divisible by both 2 and 3, it is divisible by 6.

Checking the divisibility by 2: Since the number has 2 in its units place, it is divisible by 2.
Checking the divisibility by 3: The sum of the digits of the number, 7 + 1 + 2 + 3 + 2, is 15, which is divisible by 3. So, the number is divisible by 3.

(iv) Since 934706 is not divisible by 3, it is not divisible by 6.
Checking the divisibility by 3: Since the sum of the digits of the number, 9 + 3 + 4 + 7 + 0 + 6, is 29, which is not divisible by 3. So, the number is not divisible by 3.

(v) Since 251780 is not divisible by 3, it is not divisible by 6.
Checking the divisibility by 3: The sum of the digits of the number, 2 + 5 + 1 + 7 + 8 + 0, is 23, which is not divisible by 3. So, the number is not divisible by 3.

(vi) Since 872536 is not divisible by 3, it is not divisible by 6.
Checking the divisibility by 3: The sum of the digits of the number, 8 + 7 + 2 + 5 + 3 + 6, is 31, which is not divisible by 3. So, the number is not divisible by 3.

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Question 6:

Test the divisibility of the following numbers by 7:
(i) 826
(ii) 117
(iii) 2345
(iv) 6021
(v) 14126
(vi) 25368

ANSWER:

To determine if a number is divisible by 7, double the last digit of the number and subtract it from the number formed by the remaining digits. If their difference is a multiple of 7, the number is divisible by 7.

(i) 826 is divisible by 7.
We have $82 - 2 \times 6 = 70$, which is a multiple of 7.

(ii) 117 is not divisible by 7.
We have $11 - 2 \times 7 = -3$, which is not a multiple of 7.

(iii) 2345 is divisible by 7.
We have $234 - 2 \times 5 = 224$, which is a multiple of 7.

(iv) 6021 is divisible by 7.
We have $602 - 2 \times 1 = 600$, which is not a multiple of 7.

(v) 14126 is divisible by 7.
We have $1412 - 2 \times 6 = 1400$, which is a multiple of 7.

(vi) 25368 is divisible by 7.
We have $2536 - 2 \times 8 = 2520$, which is a multiple of 7.

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Question 7:

Test the divisibility of the following numbers by 8:
(i) 9364
(ii) 2138
(iii) 36792
(iv) 901674
(v) 136976
(vi) 1790184

ANSWER:

A number is divisible by 8 if the number formed by the last three digits (digits in the hundreds, tens and units places) is divisible by 8.

(i) 9364 is not divisible by 8.
It is because the number formed by its hundreds, tens and ones digits, i.e., 364, is not divisible by 8.

(ii) 2138 is not divisible by 8.
It is because the number formed by its hundreds, tens and ones digits, i.e., 138, is not divisible by 8.

(iii) 36792 is divisible by 8.
It is because the number formed by its hundreds, tens and ones digits, i.e., 792, is divisible by 8.

(iv) 901674 is not divisible by 8.

It is because the number formed by its hundreds, tens and ones digits, i.e., 674, is not divisible by 8.

(v) 136976 is divisible by 8.
It is because the number formed by its hundreds, tens and ones digits, i.e., 976, is divisible by 8.

(vi) 1790184 is divisible by 8.
It is because the number formed by its hundreds, tens and ones digits, i.e., 184, is divisible by 8.

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Question 8:

Test the divisibility of the following numbers by 9:
(i) 2358
(ii) 3333
(iii) 98712
(iv) 257106
(v) 647514
(vi) 326999

ANSWER:

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

(i) 2358 is divisible by 9, because the sum of its digits, 2 + 3 + 5 + 8, is 18, which is divisible by 9.

(ii) 3333 is not divisible by 9, because the sum of its digits, 3 + 3 + 3 + 3, is 12, which is not divisible by 9.

(iii) 98712 is divisible by 9, because the sum of its digits, 9 + 8 + 7 + 1 + 2, is 27, which is divisible by 9.

(iv) 257106 is not divisible by 9, because the sum of its digits, 2 + 5 + 1 0 + 6, is 21, which is not divisible by 9.

(v) 647514 is divisible by 9, because the sum of its digits, 6 + 4 + 7 + 5 + 1 + 4, is 27, which is divisible by 9.

(vi) 326999 is not divisible by 9, because the sum of its digits, 3 + 2 + 6 + 9 + 9 + 9, is 38, which is not divisible by 9.

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Question 9:

Test the divisibility of the following numbers by 10:
(i) 5790
(ii) 63215
(iii) 55555

ANSWER:

A number is divisible by 10 if its ones digit is 0.

(i) 5790 is divisible by 10, because its ones digit is 0.
(ii) 63215 is not divisible by 10, because its ones digit is 5, not 0.
(iii) 55555 is not divisible by 10, because its ones digit is 5, not 0.

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Question 10:

Test the divisibility of the following numbers by 11:
(i) 4334
(ii) 83721
(iii) 66311
(iv) 137269
(v) 901351
(vi) 8790322

ANSWER:

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

(i) 4334 is divisible by 11.

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, which is divisible by 11.

(ii) 83721 is divisible by 11.
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, which is divisible by 11.

(iii) 66311 is not divisible by 11.

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, which is not divisible by 11.

(iv) 137269 is divisible by 11.

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, which is a divisible by 11.

(v) 901351 is divisible by 11.

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, which is divisible by 11.

(vi) 8790322 is not divisible by 11.

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, which is not divisible by 11.

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Question 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
(iv) 62*35
(v) 234*17
(vi) 6*1054

ANSWER:

(i) 27$\underline{2}$4
Here, 2 + 7 + * + 4 = 13 + * should be a multiple of 3.
To be divisible by 3, the least value of * should be 2, i.e., 13 + 2 = 15, which is a multiple of 3.
∴ * = 2

(ii) 53$\underline{0}$46
Here, 5 + 3 + * + 4 + 6 = 18 + * should be a multiple of 3.
As 18 is divisible by 3, the least value of * should be 0, i.e., 18 + 0 = 18.
$\therefore$ * = 0

(iii) 8$\underline{1}$711
Here, 8+ * + 7 + 1 + 1 = 17 + * should be a multiple of 3.
To be divisible by 3, the least value of * should be 1, i.e., 17 + 1 = 18 , which is a multiple of 3.
$\therefore$ * = 1

(iv) 62$\underline{2}$35
Here, 6 + 2 + * + 3 + 5 = 16 + * should be a multiple of 3.
To be divisible by 3, the least value of * should be 2, i.e., 16 + 2 = 18, which is a multiple of 3.
$\therefore$ * = 2

(v) 234$\underline{1}$17
Here, 2+ 3 +4 + * + 1 + 7 = 17 + * should be a multiple of 3.
To be divisible by 3, the least value of * should be 1, i.e., 17 + 1 = 18, which is a multiple of 3.
$\therefore$ * =1

(vi) 6$\underline{2}$1054
Here, 6 + * +1 + 0 + 5 + 4 = 16 + * should be a multiple of 3.
To be divisible by 3, the least value of * should be 2, i.e., 16 + 2 = 18, which is a multiple of 3.
$\therefore$ * =2

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Question 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*
(iv) 91*67
(v) 6678*1
(vi) 835*86

ANSWER:

(i) 65$\underline{2}$5
Here, 6 + 5+ * + 5 = 16 + * should be a multiple of 9.
To be divisible by 9, the least value of * should be 2, i.e., 16 + 2 = 18, which is a multiple of 9.

$\therefore$ * =2

(ii) 27135
Here, 2 + * + 1 + 3 + 5 = 11 + * should be a multiple of 9.
To be divisible by 9, the least value of * should be 7, i.e., 11 + 7 = 18, which is a multiple of 9.
$\therefore$ * = 7

(iii) 67023
Here, 6 + * + 7 + 0 + 2 = 15 + * should be a multiple of 9.
To be divisible by 9, the least value of * should be 3, i.e., 15 + 3 = 18, which is a multiple of 9.
$\therefore$ * = 3

(iv) 91467
Here, 9 + 1 * + 6 + 7 = 23 + * should be a multiple of 9.
To be divisible by 9, the least value of * should be 4, i.e., 23 + 4 = 27, which is a multiple of 9.
$\therefore$ * = 4

(v) 667881
Here, 6 + 6 + 7 + 8 + * + 1 = 28 + * should be a multiple of 9.
To be divisible by 9, the least value of * should be 8, i.e., 28 + 8 = 36, which is a multiple of 9.
$\therefore$ * = 8

(vi) 835686
Here, 8 + 3 + 5 + * + 8 + 6 = 30 + * should be a multiple of 9.
To be divisible of 9, the least value of * should be 6, i.e., 30 + 6 = 36, which is a multiple of 9.
$\therefore$ * = 6

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Question 13:

In each of the following numbers, replace * by the smallest number to make it divisible by 11:
(i) 26*5
(ii) 39*43
(iii) 86*72
(iv) 467*91
(v) 1723*4
(vi) 9*8071

ANSWER:

(i) 26*5
Sum of the digits at odd places = 5 + 6 = 11

Sum of the digits at even places = * + 2
Difference = sum of odd terms – sum of even terms
= 11 – (* + 2)
= 11 – * – 2
= 9 – *
Now, (9 – *) will be divisible by 11 if * = 9.
i.e., 9 – 9 = 0
0 is divisible by 11.
∴ * = 9
Hence, the number is 2695.

(ii) 39*43
Sum of the digits at odd places = 3 + * + 3 = 6 + *
Sum of the digits at even places = 4 + 9 = 13
Difference = sum of odd terms – sum of even terms
= 6 + * – 13
= * – 7
Now, (* – 7) will be divisible by 11 if * = 7.
i.e., 7 – 7 = 0
0 is divisible by 11.
∴ * = 7
Hence, the number is 39743.

(iii) 86*72
Sum of the digits at odd places 2 + * + 8 = 10 + *
Sum of the digits at even places 6 + 7 = 13
Difference = sum of odd terms – sum of even terms
= 10 + * – 13
= * – 3
Now, (* – 3) will be divisible by 11 if * = 3.
i.e., 3 – 3 = 0
0 is divisible by 11.
∴ * = 3
Hence, the number is 86372.

(iv) 467*91
Sum of the digits at odd places 1 + * + 6 = 7 + *
Sum of the digits at even places 9 + 7 + 4 = 20
Difference = sum of odd terms – sum of even terms
= (7 + *) − 20
= * − 13
Now, (* −13) will be divisible by 11 if * = 2.
i.e., 2− 13 = −11
−11 is divisible by 11.
∴ * = 2
Hence, the number is 467291.

(v) 1723*4
Sum of the digits at odd places 4+ 3+ 7= 14
Sum of the digits at even places *+2+1 = 3 + *
Difference = sum of odd terms – sum of even terms
= 14 – (3 + *)
= 11 − *
Now, (11 − *) will be divisible by 11 if * = 0.
i.e., 11 − 0 = 11
11 is divisible by 11.
∴ * = 0
Hence, the number is 17230<u>4</u>.

(vi) 9*8071
Sum of the digits at odd places 1+0+* = 1 + *
Sum of the digits at even places 7 + 8 + 9 = 24
Difference = sum of odd terms – sum of even terms
=1 + * – 24
= * − 23
Now, (* − 23) will be divisible by 11 if * = 1.
i.e., 1 − 23 = −22
−22 is divisible by 11.
∴ * = 1
Hence, the number is 9<u>1</u>8071.

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Question 14:

Test the divisibility of:
(i) 1000001 by 11
(ii) 19083625 by 11
(iii) 2134563 by 9
(iv) 10001001 by 3
(v) 10203574 by 4
(vi) 12030624 by 8

ANSWER:

(i) 10000001 by 11
10000001 is divisible by 11.
Sum of digits at odd places = (1 + 0 + 0 + 0) = 1
Sum of digits at even places = (0 + 0 + 0 + 1) = 1
Difference of the two sums = (1 − 1) = 0, which is divisible by 11.

(ii) 19083625 by 11
19083625 is divisible by 11.
Sum of digits at odd places = (5 + 6 + 8 + 9) = 28
Sum of digits at even places = (2 + 3 + 0 + 1) = 6
Difference of the two sums = (28 − 6) = 22, which is divisible by 11.

(iii) 2134563 by 9
2134563 is not divisible by 9.
It is because the sum of its digits, 2 + 1 + 3 + 4 + 5 + 6 + 3, is 24, which is not divisible by 9.

(iv) 10001001 by 3
10001001 is divisible by 3.
It is because the sum of its digits, 1 + 0 + 0 + 0 + 1 + 0 + 0 + 1, is 3, which is divisible by 3.

(v) 10203574 by 4
10203574 is not divisible by 4.
It is because the number formed by its tens and the ones digits is 74, which is not divisible by 4.
(vi) 12030624 by 8
12030624 is divisible by 8.
It is because the number formed by its hundreds, tens and ones digits is 624, which is divisible by 8.

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Question 15:

Which of the following are prime numbers?
(i) 103
(ii) 137
(iii) 161
(iv) 179
(v) 217
(vi) 277
(vii) 331
(viii) 397

ANSWER:

A number between 100 and 200 is a prime number if it is not divisible by any prime number less than 15.
Similarly, a number between 200 and 300 is a prime number if it is not divisible by any prime number less than 20.

(i) 103 is a prime number, because it is not divisible by 2, 3, 5, 7, 11 and 13.
(ii) 137 is a prime number, because it is not divisible by 2, 3, 5, 7 and 11.
(iii) 161 is a not prime number, because it is divisible by 7.
(iv) 179 is a prime number, because it is not divisible by 2, 3, 5, 7, 11 and 13.
(v) 217 is a not prime number, because it is divisible by 7.
(vi) 277 is a prime number, because it is not divisible by 2, 3, 5, 7, 11, 13, 17 and 19.
(vii) 331 is a prime number, because it is not divisible by 2, 3, 5, 7, 11, 13, 17 and 19.
(viii) 397 is a prime number, because it is not divisible by 2, 3, 5, 7, 11, 13, 17 and 19.

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Question 16:

Give an example of a number
(i) which is divisible by 2 but not by 4.
(ii) which is divisible by 4 but not by 8.
(iii) which is divisible by both 2 and 8 but not by 16.
(iii) which is divisible by both 3 and 6 but not by 18.

ANSWER:

(i) 14 is divisible by 2, but not by 4.
(ii) 12 is divisible by 4, but not by 8.
(iii) 24 is divisible by both 2 and 8, but not by 16.
(iv) 30 is divisible by both 3 and 6, but not by 18.

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Question 17:

Write (T) for true and (F) for false against each of the following statements:
(i) If a number is divisible by 4, it must be divisible by 8.
(ii) If a number is divisible by 8, it must be divisible by 4.
(iii) If a number divides the sum of two numbers exactly, it must exactly divide the numbers separately.
(iv) If a number is divisible by both 9 and 10, it must be divisible by 90.
(v) A number is divisible by 18 if it is divisible by both 3 and 6.
(vi) If a number is divisible by 3 and 7, it must be divisible by 21.
(vii) The sum of two consecutive odd numbers is always divisible by 4.
(viii) If a number divides two numbers exactly, it must divide their sum exactly.

ANSWER:

(i) If a number is divisible by 4, it must be divisible by 8. False
Example: 28 is divisible by 4 but not divisible by 8.

(ii) If a number is divisible by 8, it must be divisible by 4. True
Example: 32 is divisible by both 8 and 4.

(iii) If a number divides the sum of two numbers exactly, it must exactly divide the numbers separately. False
Example: 91 (51 + 40) is exactly divisible by 13. However, 13 does not exactly divide 51 and 40.

(iv) If a number is divisible by both 9 and 10, it must be divisible by 90. True
Example: 900 is both divisible by 9 and 10. It is also divisible by 90.

(v) A number is divisible by 18 if it is divisible by both 3 and 6. False
A number has to be divisible by 9 and 2 to be divisible by 18.
Example: 48 is divisible by 3 and 6, but not by 18.

(vi) If a number is divisible by 3 and 7, it must be divisible by 21. True
Example: 42 is divisible by both 3 and 7. It is also divisible by 21.

(vii) The sum of consecutive odd numbers is always divisible by 4. True
Example: 11 and 13 are consecutive odd numbers.
11 + 13 = 24, which is divisible by 4.

(viii) If a number divides two numbers exactly, it must divide their sum exactly. True
Example: 42 and 56 are exactly divisible by 7.
42+56 = 98, which is exactly divisible by 7.

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Question 1:

Give the prime factorization of each of the following numbers:
12

ANSWER:

We use the division method as shown below:

$2 \mid 12$
$2 \mid 6$
$3 \mid 3$
1

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

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Question 2:

Give the prime factorization of each of the following numbers:
18

ANSWER:

We will use the division method as shown below:

$2 \mid 18$
$3 \mid 9$
$3 \mid 3$
1

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

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Question 3:

Give the prime factorization of each of the following numbers:
48

ANSWER:

We will use the division method as shown below:

$2\overline{)48}$
$2\overline{)24}$
$2\overline{)12}$
$2\overline{)6}$
$3\overline{)3}$
1

$\therefore 48 = 2 \times 2 \times 2 \times 2 \times 3$
$= 2^4 \times 3$

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Question 4:

Give the prime factorization of each of the following numbers:
56

ANSWER:

We will use the division method as shown below:

$2\overline{)56}$
$2\overline{)28}$
$2\overline{)14}$
7

$\therefore 56 = 2 \times 2 \times 2 \times 7$
$= 2^3 \times 7$

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Question 5:

Give the prime factorization of each of the following numbers:
90

ANSWER:

We will use the division method as shown below:

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

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

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Question 6:

Give the prime factorization of each of the following numbers:
136

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 2 & 136 \\ 2 & 68 \\ 2 & 34 \\ 17 & 17 \\ & 1 \end{array}$$

$\therefore 136 = 2 \times 2 \times 2 \times 17$
$= 2^3 \times 17$

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Question 7:

Give the prime factorization of each of the following numbers:
252

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 2 & 252 \\ 2 & 126 \\ 3 & 63 \\ 3 & 21 \\ 7 & 7 \\ & 1 \end{array}$$

$\therefore 252 = 2 \times 2 \times 3 \times 3 \times 7 \times 1$
$= 2^2 \times 3^2 \times 7 \times 1$

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Question 8:

Give the prime factorization of each of the following numbers:
420

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 2 & 420 \\ 2 & 210 \\ 3 & 105 \\ 7 & 35 \\ 5 & 5 \\ & 1 \end{array}$$

$\therefore 420 = 2 \times 2 \times 3 \times 7 \times 5 \times 1$
$= 2^2 \times 3 \times 5 \times 7$

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Question 9:

Give the prime factorization of each of the following numbers:

637

ANSWER:

We will use the division method as shown below:

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

$\therefore 637 = 7 \times 7 \times 13$

$= 7^2 \times 13$

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Question 10:

Give the prime factorization of each of the following numbers:

945

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 3 & 945 \\ 3 & 315 \\ 3 & 105 \\ 5 & 35 \\ 7 & 7 \\ \hline & 1 \end{array}$$

$\therefore 945 = 3 \times 3 \times 3 \times 5 \times 7 \times 1$

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

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Question 11:

Give the prime factorization of each of the following numbers:
1224

ANSWER:

We will use the division method as shown below:

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

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

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Question 12:

Give the prime factorization of each of the following numbers:
1323

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 3 & 1323 \\ 3 & 441 \\ 3 & 147 \\ 7 & 49 \\ 7 & 7 \\ & 1 \end{array}$$

$\therefore 1323 = 3 \times 3 \times 3 \times 7 \times 7 \times 1$
$= 3^3 \times 7^2$

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Question 13:

Give the prime factorization of each of the following numbers:
8712

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 2 & 8712 \\ 2 & 4356 \\ 2 & 2178 \\ 3 & 1089 \\ 3 & 363 \\ 11 & 121 \\ 11 & 11 \\ & 1 \end{array}$$

$\therefore 8712 = 2 \times 2 \times 2 \times 3 \times 3 \times 11 \times 11$

$= 2^3 \times 3^2 \times 11^2$

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Question 14:

Give the prime factorization of each of the following numbers:
9317

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 7 & 9317 \\ 11 & 1331 \\ 11 & 121 \\ 11 & 11 \\ & 1 \end{array}$$

$\therefore 9317 = 7 \times 11 \times 11 \times 11$

$= 7 \times 11^3$

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Question 15:

Give the prime factorization of each of the following numbers:
1035

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 3 & 1035 \\ 3 & 345 \\ 5 & 115 \\ 23 & 23 \\ & 1 \end{array}$$

$\therefore 1035 = 3 \times 3 \times 5 \times 23$
$= 3^2 \times 5 \times 23$

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Question 16:

Give the prime factorization of each of the following numbers:
1197

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 3 & 1197 \\ 3 & 399 \\ 7 & 133 \\ 19 & 19 \\ & 1 \end{array}$$

$\therefore 1197 = 3 \times 3 \times 7 \times 19$
$= 3^2 \times 7 \times 19$

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Question 17:

Give the prime factorization of each of the following numbers:
4641

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 3 & 4641 \\ 7 & 1547 \\ 13 & 221 \\ 17 & 17 \\ & 1 \end{array}$$

$\therefore 4614 = 3 \times 7 \times 13 \times 17$

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Question 18:

Give the prime factorization of each of the following numbers:
4335

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 3 & 4335 \\ 5 & 1445 \\ 17 & 289 \\ 17 & 17 \\ & 1 \end{array}$$

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

$= 3 \times 5 \times 17^2$

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Question 19:

Give the prime factorization of each of the following numbers:
2907

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 3 & 2907 \\ 3 & 969 \\ 17 & 323 \\ 19 & 19 \\ & 1 \end{array}$$

$\therefore 2907 = 3 \times 3 \times 17 \times 19$
$= 3^2 \times 17 \times 19$

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Question 20:

Give the prime factorization of each of the following numbers:
13915

ANSWER:

We will use the division method as shown below:

$$\begin{array}{r|l} 5 & 13915 \\ 11 & 2783 \\ 11 & 253 \\ 23 & 23 \\ & 1 \end{array}$$

$\therefore 13915 = 5 \times 11 \times 11 \times 23$
$= 3 \times 11^2 \times 23$

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Question 1:

Find the HCF of the numbers in each of the following, using the prime factorization method:
84, 98

ANSWER:

The given numbers are 84 and 98.

We have:

$$\begin{array}{r|l} 2 & 84 \\ \hline 2 & 42 \\ \hline 3 & 21 \\ \hline 7 & 7 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 2 & 98 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$84 = 2 \times 2 \times 3 \times 7 = 2^2 \times 3 \times 7$
$98 = 2 \times 7 \times 7 = 2 \times 7^2$

$\therefore$ HCF of the given numbers $= 2 \times 7 = 14$

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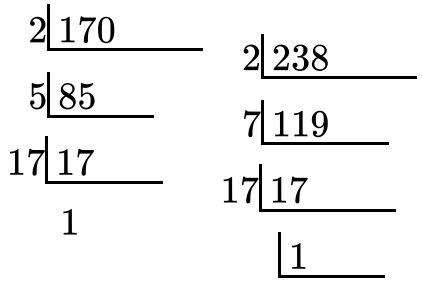
Question 2:

Find the HCF of the numbers in each of the following, using the prime factorization method:
170, 238

ANSWER:

The given numbers are 170 and 238.

We have:



170 = 2 × 5 × 17
238 = 2 × 7 × 17

∴ H.C.F. of the given numbers = 2 × 17 = 34

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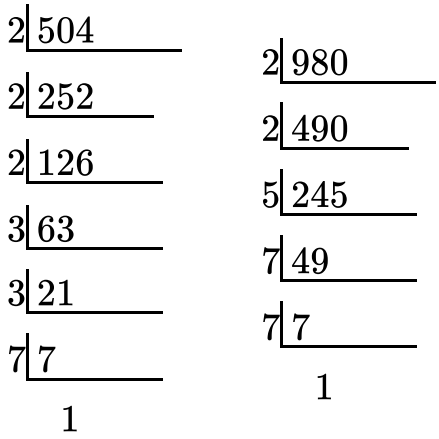
Question 3:

Find the HCF of the numbers in each of the following, using the prime factorization method:
504, 980

ANSWER:

The given numbers are 504 and 980.

We have:



504 = 2 × 2 ×2 × 3 × 3 × 7 = $2^3 \times 3^2 \times 7$
980 = 2 × 2 × 5× 7 × 7 = $2^2 \times 5 \times 7^2$
∴ HCF of the given numbers = $2^2 \times 7 = 28$

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Question 4:

Find the HCF of the numbers in each of the following, using the prime factorization method:
72, 108, 180

ANSWER:

The given numbers are 72, 108 and 180

We have:

2 | 72	2 | 108	2 | 180
2 | 36	2 | 54	2 | 90
2 | 18	3 | 27	3 | 45
3 | 9	3 | 9	3 | 15
3 | 3	3 | 3	5 | 5
1	1	1

Now, $72=2 \times 2 \times 2 \times 3 \times 3 = 2^3 \times 3^2$
$108 = 2 \times 2 \times 3 \times 3 \times 3 = 2^2 \times 3^3$
$180 = 2 \times 2 \times 3 \times 3 \times 5 = 2^2 \times 3^2 \times 5$
$\therefore$ HCF $=2^2 \times 3^2 = 36$

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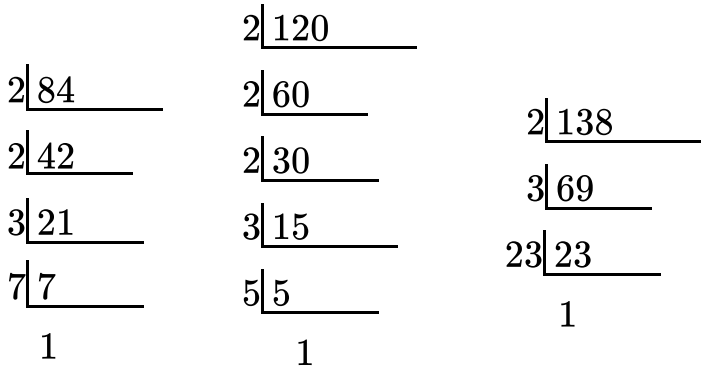
Question 5:

Find the HCF of the numbers in each of the following, using the prime factorization method:
84, 120, 138

ANSWER:

The given numbers are 84, 120 and 138.

We have:



Now, 84 = 2 × 2 ×3 × 7
120 = 2 × 2× 2 ×3 × 5
138 = 2 × 3 × 23
∴ HCF = 2 × 3 = 6

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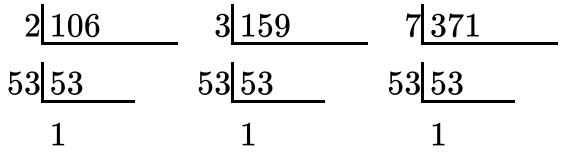
Question 6:

Find the HCF of the numbers in each of the following, using the prime factorization method:
106, 159, 371

ANSWER:

The given numbers are 106, 159 and 371.
We have:



Now, 106 = 2 × 53
159 = 3 × 53
371 = 7 × 53
∴ HCF = 53

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Question 7:

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

method:
272, 425

ANSWER:

Given numbers are 272 and 425.

We have:

$$\begin{array}{r|l} 2 & 272 \\ \hline 2 & 136 \\ \hline 2 & 68 \\ \hline 2 & 34 \\ \hline 17 & 17 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 5 & 425 \\ \hline 5 & 85 \\ \hline 17 & 17 \\ \hline & 1 \end{array}$$

Now, 272 = 2 × 2× 2 × 2 × 17
425 = 5 × 5 × 17
∴ The required HCF is 17.

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Question 8:

Find the HCF of the numbers in each of the following, using the prime factorization method:
144, 252, 630

ANSWER:

The given numbers are 144, 252 and 630.
We have:

2 | 144	2 | 252	2 | 630
2 | 72	2 | 126	3 | 315
2 | 36	3 | 63	3 | 105
2 | 18	3 | 21	5 | 35
3 | 9	7 | 7	7 | 7
3 | 3	1	1
1		

Now, 144 = 2 × 2× 2 × 2× 3 × 3
252 = 2 ×2 × 3× 3 × 7
630 = 2 ×3 × 3× 5 × 7
∴ HCF = 2 × 3 × 3 =18

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Question 9:

Find the HCF of the numbers in each of the following, using the prime factorization method:
1197, 5320, 4389

ANSWER:

The given numbers are 1197, 5320 and 4389.

We have:

3 | 1197	2 | 5320	3 | 4389
3 | 399	2 | 2660	7 | 1463
7 | 133	2 | 1330	19 | 209
19 | 19	5 | 665	11 | 11
1	7 | 133	1
	19 | 19	
	1	

Now, 1197 = 3 × 3× 7× 19 = 3^2 × 7 × 19
5320 = 2 × 2 × 2× 5 × 7 × 19 = 2^3 × 5 × 7 × 19
4389 = 3 ×7 × 19 × 11

∴ Required HCF = 19 × 7 = 133

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Question 10:

Find the HCF of the numbers in each of the following, using the division method:
58, 70

ANSWER:

We have:

$$
\begin{array}{r}
1 \\
58\overline{)\,70} \\
-58 \\
\hline
12\overline{)\,58}\,(4 \\
-48 \\
\hline
10\overline{)\,12}\,(1 \\
-10 \\
\hline
2\overline{)\,10}\,(5 \\
-10 \\
\hline
0
\end{array}
$$

∴ The HCF of 58 and 70 is 2.

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Question 11:

Find the HCF of the numbers in each of the following, using the division method:
399, 437

ANSWER:

The given numbers are 399 and 437.

We have:

$$
\begin{array}{r}
1 \\
399\overline{)\,437} \\
-399 \\
\hline
38\overline{)\,399}\,(10 \\
-380 \\
\hline
19\overline{)\,38}\,(2 \\
-38 \\
\hline
0
\end{array}
$$

∴ The HCF is 19.

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Question 12:

Find the HCF of the numbers in each of the following, using the division method:
1045, 1520

ANSWER:

The given numbers are 1045 and 1520.
We have:

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

∴ The HCF of 1045 and 1520 is 95.

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Question 13:

Find the HCF of the numbers in each of the following, using the division method:
1965, 2096

ANSWER:

The given numbers are 1965 and 2096.

We have:

$$
\begin{array}{r}
1 \\
1965\overline{)\,2096} \\
-1965 \\
\hline
131\overline{)\,1965}\,(15 \\
-1965 \\
\hline
0
\end{array}
$$

∴ The HCF is 131.

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Question 14:

Find the HCF of the numbers in each of the following, using the division method:
2241, 2324

ANSWER:

The given numbers are 2241and 2341.
We have:

$$
\begin{array}{r}
1 \\
2241\overline{)\,2324} \\
-2241 \\
\hline
83\overline{)\,2241}\,(27 \\
-2241 \\
\hline
0
\end{array}
$$

∴ HCF = 83

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Question 15:

Find the HCF of the numbers in each of the following, using the division method:
658, 940, 1128

ANSWER:

The given numbers are 658, 940 and 1128.

First we will find the HCF of 658 and 940.

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

Thus, the HCF of 658 and 940 is 94.

Now, we will find the HCF of 94 and 1128.

$$
\begin{array}{r}
1 \\
94\overline{)\,1128} \\
-1128 \\
\hline
0
\end{array}
$$

Thus, the HCF of 94 and 1128 is 94.

∴ The HCF of 658, 940 and 1128 is 94.

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Question 16:

Find the HCF of the numbers in each of the following, using the division method:
754, 1508, 1972

ANSWER:

The given numbers are 754, 1508 and 1972.

First, we will find the HCF of 754 and 1508.

$$
\begin{array}{r}
2 \\
754\overline{)\,1508} \\
-1508 \\
\hline
0
\end{array}
$$

So, the HCF of 754 and 1508 is 754.

Now, we will find the HCF of 754 and 1972.

$$
\begin{array}{r}
2 \\
754\overline{)\,1972} \\
-1508 \\
\hline
464\overline{)\,754}\,(1 \\
-464 \\
\hline
290\overline{)\,464}\,(1 \\
-290 \\
\hline
174\overline{)\,290}\,(1 \\
-174 \\
\hline
116\overline{)\,174}\,(1 \\
-116 \\
\hline
58\overline{)\,116}\,(2 \\
-116 \\
\hline
0
\end{array}
$$

So, the HCF of 754 and 1972 is 58.

∴ The HCF of 754, 1058 and 1972 is 58.

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Question 17:

Find the HCF of the numbers in each of the following, using the division method:
391, 425, 527

ANSWER:

The given numbers are 391, 425 and 527.
First, we will find the HCF of 391 and 425.

$$
\begin{array}{r}
1 \\
391\overline{)\,425} \\
391 \\
\hline
34\overline{)\,391}\,(11 \\
-374 \\
\hline
17\overline{)\,34}\,(2 \\
-34 \\
\hline
0
\end{array}
$$

So, the HCF of 391 and 425 is 17.
Now, we will find the HCF of 17 and 527.

$$
\begin{array}{r}
30 \\
17\overline{)\,527} \\
\underline{510} \\
17\overline{)\,17\,(1} \\
\underline{-17} \\
0
\end{array}
$$

So, the HCF of 17 and 527 is 17.
∴ The HCF of 391, 425 and 527 is 17.

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Question 18:

Find the HCF of the numbers in each of the following, using the division method:
1794, 2346, 4761

ANSWER:

The given numbers are 1794, 2346 and 4761.
First, we will find the HCF of 1794 and 2346.

$$
\begin{array}{r}
1 \\
1794\overline{)\,2346} \\
\underline{-1794} \\
552\overline{)\,1794\,(3} \\
\underline{-1656} \\
138\overline{)\,552\,(4} \\
\underline{-552} \\
0
\end{array}
$$

So, the HCF of 1794 and 2346 is 138.
Now, we will find the HCF of 138 and 4761.

$$
\begin{array}{r}
34 \\
138\overline{)\,4761} \\
\underline{-4692} \\
69\overline{)\,138\,(2} \\
\underline{-138} \\
0
\end{array}
$$

So, the HCF of 138 and 4761 is 69.

∴ The HCF of 1794, 2346 and 4761 is 69.

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Question 19:

Show that the following pairs are co-primes:
59, 97

ANSWER:

The given numbers are 59 and 97.

59=59×1
97=97×1

∴ HCF = 1

Since 59 and 97 does not have any common factor other than 1, the two numbers are co-primes.

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Question 20:

Show that the following pairs are co-primes:
161, 192

ANSWER:

The given numbers are 161 and 192.
We have:

```
                2 | 192
                2 |  96
                2 |  48
  7 | 161       2 |  24
 23 |  23       2 |  12
    |   1       2 |   6
                    3
```

Now, 161 = 7 × 23 × 1
192 = 2 × 2× 2 ×2 × 2× 2 × 3 = 2^6 × 3 × 1
∴ HCF = 1
Hence, 161 and 192 are co-primes.

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Question 21:

Show that the following pairs are co-primes:
343, 432

ANSWER:

The given numbers are 343 and 432.
We have:

	2 | 432
	2 | 216
7 | 343	2 | 108
7 | 49	2 | 54
7 | 7	3 | 27
1	3 | 9
	3 | 3
	1

Now, $343 = 7 \times 7 \times 7 \times 1 = 7^3 \times 1$
$432 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 2^4 \times 3^3 \times 1$
$\therefore$ HCF =1
Hence, 343 and 432 are co-primes.

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Question 22:

Show that the following pairs are co-primes:
512, 945

ANSWER:

Given numbers are 512 and 945.
We have:

$$\begin{array}{r|l} 2 & 512 \\ 2 & 256 \\ 2 & 128 \\ 2 & 64 \\ 2 & 32 \\ 2 & 16 \\ 2 & 8 \\ 2 & 4 \\ 2 & 2 \\ & 1 \end{array}$$

$$\begin{array}{r|l} 7 & 7 \\ & 1 \end{array}$$

$512 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^9$
$945 = 3 \times 3 \times 3 \times 5 \times 7 = 3^3 \times 5 \times 7$
Thus, the HCF of 512 and 945 is 1.
$\therefore$ 512 and 945 are co-primes.

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Question 23:

Show that the following pairs are co-primes:
385, 621

ANSWER:

The given numbers are 385 and 621.

$$\begin{array}{r|l} 5 & 385 \\ 7 & 77 \\ 11 & 11 \\ & 1 \end{array} \qquad \begin{array}{r|l} 3 & 621 \\ 3 & 207 \\ 3 & 69 \\ 23 & 23 \\ & 1 \end{array}$$

$385 = 5 \times 7 \times 11 \times 1$
$621 = 3 \times 3 \times 3 \times 23 = 3^3 \times 23 \times 1$
$\therefore$ HCF = 1

Hence, they are co-primes.

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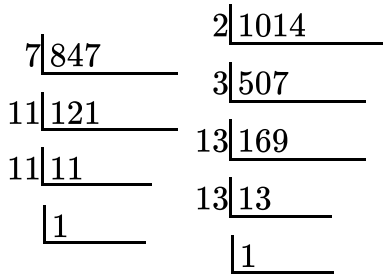
Question 24:

Show that the following pairs are co-primes:
847, 1014

ANSWER:

The given numbers are 847 and 1014.



$847 = 7 \times 11 \times 11 \times 1 = 7 \times 11^2 \times 1$
$1014 = 2 \times 3 \times 13 \times 13 \times 1$
$\therefore$ HCF = 1
Hence, 847 and 1014 are co-primes.

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Question 25:

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

ANSWER:

Because the remainder is 6, we have to find the number that exactly divides (615 - 6) and (963 - 6).

Required number = HCF of 609 and 957

$$
\begin{array}{r}
1 \\
609\overline{)\ 957} \\
-609 \\
\hline
\end{array}
$$

$$
\begin{array}{r}
348\overline{)609}\,(1 \\
-348 \\
\hline
\end{array}
$$

$$
\begin{array}{r}
261\overline{)348}\,(1 \\
-\ 261 \\
\hline
87\overline{)261}\,(3 \\
-\ 261 \\
\hline
0
\end{array}
$$

Therefore, the required number is 87.

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Question 26:

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

ANSWER:

Clearly, we have to find the number which exactly divides (2011 − 9) and (2623 − 5).
So, the required number is the HCF of 2002 and 2618.

$$
\begin{array}{r}
1 \\
2002\overline{)\ 2618} \\
-2002 \\
\hline
\end{array}
$$

$$
\begin{array}{r}
616\overline{)2002}\,(3 \\
-1848 \\
\hline
\end{array}
$$

$$
\begin{array}{r}
154\overline{)616}\,(4 \\
-\ 616 \\
\hline
0
\end{array}
$$

∴ The required number is 154.

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Question 27:

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

ANSWER:

Since the respective remainders of 445, 572 and 699 are 4, 5 and 6, we have to find the number which exactly divides (445-4), (572-5) and (696-6).

So, the required number is the HCF of 441, 567 and 693.
Firstly, we will find the HCF of 441 and 567.

$$
\begin{array}{r}
1 \\
441\overline{)\,567} \\
-441 \\
\hline
126\overline{)\,441}\,(3 \\
-378 \\
\hline
63\overline{)\,126}\,(2 \\
-126 \\
\hline
0
\end{array}
$$

∴ HCF = 63

Now, we will find the HCF of 63 and 693.

$$
\begin{array}{r}
11 \\
63\overline{)\,693} \\
-693 \\
\hline
0
\end{array}
$$

∴ HCF = 63

Hence, the required number is 63.

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Question 28:

Reduce each of the following fractions to the lowest terms:
(i) $\frac{161}{207}$

(ii) $\frac{517}{799}$
(iii) $\frac{296}{481}$

ANSWER:

(i) $\frac{161}{207}$

To reduce the given fraction to its lowest term, we will divide the numerator and the denominator by their HCF.

Now, we will find the HCF of 161 and 207.

$$
\begin{array}{r}
1 \\
161\overline{)\,207} \\
-161 \\
\hline
46\overline{)\,161}\,(3 \\
-138 \\
\hline
23\overline{)\,46}\,(2 \\
-46 \\
\hline
0
\end{array}
$$

∴ HCF = 23

Dividing the numerator and the denominator by the HCF, we get:

$\frac{161 \div 23}{207 \div 23} = \frac{7}{9}$

(ii) $\frac{517}{799}$

To reduce the given fraction to its lowest term, we will divide the numerator and the denominator by their HCF.

Now, we will find the HCF of 517 and 799.

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

∴ HCF = 47

Dividing the numerator and the denominator by the HCF, we get:

$\frac{517 \div 47}{799 \div 47} = \frac{11}{17}$

(iii) $\frac{296}{481}$

To reduce the given fraction to its lowest term, we will divide the numerator and the denominator by their HCF.

Now, we will find the HCF of 296 and 481.

$$
\begin{array}{r}
1 \\
296\overline{)\,481} \\
-296 \\
\hline
185\overline{)\,296}\,(1 \\
-185 \\
\hline
111\overline{)\,185}\,(1 \\
111 \\
\hline
74\overline{)\,111}\,(1 \\
-74 \\
\hline
37\overline{)\,74}\,(2 \\
-74 \\
\hline
0
\end{array}
$$

$\therefore$ HCF = 37

Dividing the numerator and the denominator by the HCF, we get:

$\frac{296 \div 37}{481 \div 37} = \frac{8}{13}$

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Question 29:

Three pieces of timber, 42-m, 49-m and 63-m long, have to be divided into planks of the same length. What is the greatest possible length of each plank?

ANSWER:

The lengths of the three pieces of timber are 42 m, 49 m and 63 m.

The greatest possible length of each plank will be given by the HCF of 42, 49 and 63.

Firstly, we will find the HCF of 42 and 49 by division method.

$$
\begin{array}{r}
1 \\
42\overline{)\,49} \\
-42 \\
\hline
7\overline{)\,42}\,(6 \\
-42 \\
\hline
0
\end{array}
$$

∴ The HCF of 42 and 49 is 7.
Now, we will find the HCF of 7 and 63.

$$
\begin{array}{r}
9 \\
7\overline{)\,63} \\
-63 \\
\hline
0
\end{array}
$$

∴ The HCF of 7 and 63 is 7.
Therefore, HCF of all three numbers is 7
Hence, the greatest possible length of each plank is 7 m.

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Question 30:

Three different containers contain 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.

ANSWER:

Three different containers contain 403 L, 434 L and 465 L of milk.

The capacity of the container that can measure the milk in an exact number of times will be given by the HCF of 403, 434 and 465.

$$
\begin{array}{r}
1 \\
403\overline{)\,434} \\
-403 \\
\hline
31\overline{)\,403}\,(13 \\
-403 \\
\hline
0
\end{array}
$$

∴ HCF = 31

Now, we will find the HCF of 31 and 465.

$$\begin{array}{r} 15 \\ 31\overline{)\,465} \\ -465 \\ \hline 0 \end{array}$$

$\therefore$ HCF = 31

Hence, the capacity of the required container is 31 L.

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Question 31:

There are 527 apples, 646 pears and 748 oranges. These are to be arranged in heaps containing the same number of fruits. Find the greatest number of fruits possible in each heap. How many heaps are formed?

ANSWER:

Number of apples = 527
Number of pears = 646
Number of oranges = 748
The fruits are to be arranged in heaps containing the same number of fruits.
The greatest number of fruits possible in each heap will be given by the HCF of 527, 646 and 748.

Firstly, we will find the HCF of 527 and 646.

$$\begin{array}{r} 1 \\ 527\overline{)\,646} \\ -527 \\ \hline 119\overline{)\,527}\,(4 \\ -476 \\ \hline 51\overline{)\,119}\,(2 \\ 102 \\ \hline 17\overline{)\,51}\,(3 \\ -51 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 44 \\ 17\overline{)\,748} \\ -748 \\ \hline 0 \end{array}$$

$\therefore$ HCF of 527, 646 and 748 = 17

So, the greatest number of fruits in each heap will be 17.

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Question 32:

Determine the longest tape which can be used to measure exactly the lengths 7 m, 3 m 85 cm and 12 m 95 cm.

ANSWER:

7 m = 700 cm
3 m 85 cm = 385 cm
12 m 95 cm = 1295 cm

The required length of the tape that can measure the lengths 700 cm, 385 cm and 1295 cm will be given bu the HCF of 700 cm, 385 cm and 1295 cm.

Evaluating the HCF of 700, 385 and 1295 using prime factorisation method, we have:

2	700
2	350
5	175
5	35
7	7
	1

$700 = 2 \times 2 \times 5 \times 5 \times 7 = 2^2 \times 5^2 \times 7$

5	385
11	77
7	7
	1

$385 = 5 \times 11 \times 7$

5	1295
7	259
37	37
	1

$1295 = 5 \times 7 \times 37$

$\therefore$ HCF $= 5 \times 7 = 35$

Hence, the longest tape which can measure the lengths 7 m, 3 m 85 cm and 12 m 95 cm exactly is of 35 cm.

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Question 33:

A rectangular courtyard is 18 m 72 cm long and 13 m 20 cm broad. It is to be paved with square tiles of the same size. Find the least possible number of such tiles.

ANSWER:

Length of the courtyard = 18 m 72 cm = 1872 cm
Breadth of the courtyard = 13 m 20 cm = 1320 cm

Now, maximum edge of the square tile is given by the HCF of 1872 cm and 1320 cm.

$$
\begin{array}{r}
1 \\
1320\overline{)\,1872} \\
-1320 \\
\hline
552\overline{)1320}\,(2 \\
-\,1104 \\
\hline
216\overline{)552}\,(2 \\
-\,432 \\
\hline
120\overline{)216}\,(1 \\
-\,120 \\
\hline
96\overline{)120}\,(1 \\
-\,96 \\
\hline
24\overline{)96}\,(4 \\
-\,96 \\
\hline
0
\end{array}
$$

HCF of 1872 and 1320 = 24
∴ maximum edge of the square tile = 24 cm

$$\text{Required number of tiles} = \frac{\text{area of courtyard}}{\text{area of each square tile}}$$

$$= \frac{1872 \times 1320}{24 \times 24}$$

$$= 4290$$

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Question 34:

Find the HCF of
(i) two prime numbers
(ii) two consecutive numbers
(iii) two co-primes
(iv) 2 and an even number

ANSWER:

(i) 2 and 3 are two prime numbers.
Now, HCF of 2 and 3 is as follows:
$2 = 2 \times 1$
$3 = 3 \times 1$
$\therefore$ HCF = 1

(ii) 4 and 5 are two consecutive numbers.
Now, HCF of 4 and 5 is as follows:
$4 = 2 \times 2 \times 1 = 2^2 \times 1$
$5 = 5 \times 1$
$\therefore$ HCF = 1

(iii) 2 and 3 are two co-primes.
Now, HCF of 2 and 3 is as follows:
$2 = 2 \times 1$
$3 = 3 \times 1$
$\therefore$ HCF = 1

(iv) 2 and 4 are two even numbers.
Now, HCF of 2 and 4 is as follows:
$2 = 2 \times 1$
$4 = 2 \times 2 \times 1$
$\therefore$ HCF $= 2 \times 1 = 2$

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Question 1:

Find the LCM of the numbers given below:
42, 63

ANSWER:

The given numbers are 42 and 63.

We have:

$$\begin{array}{r|l} 7 & 42, 63 \\ \hline 3 & 6, 9 \\ \hline 3 & 2, 3 \\ \hline 2 & 2, 1 \\ \hline & 1, 1 \end{array}$$

∴ LCM =7 × 3 × 3 × 2 × 1
=126

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Question 2:

Find the LCM of the numbers given below:
60, 75

ANSWER:

The given numbers are 60 and 75.

We have:

$$\begin{array}{r|l} 3 & 60, 75 \\ \hline 5 & 20, 25 \\ \hline 5 & 4, 5 \\ \hline 2 & 4, 1 \\ \hline 2 & 2, 1 \\ \hline & 1, 1 \end{array}$$

∴ LCM = 3 × 5× 5 × 2 × 2

= 300

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Question 3:

Find the LCM of the numbers given below:
12, 18, 20

ANSWER:

The given numbers are 12, 18 and 20.
We have:

$$\begin{array}{r|l} 2 & 12, 18, 20 \\ \hline 2 & 6, 9, 10 \\ \hline 3 & 3, 9, 5 \\ \hline 3 & 1, 3, 5 \\ \hline 5 & 1, 1, 5 \\ \hline & 1, 1, 1 \end{array}$$

$\therefore$ LCM = 2 × 2 × 3× 3 × 5
= 180

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Question 4:

Find the LCM of the numbers given below:
36, 60, 72

ANSWER:

The given numbers are 36, 60 and 72.

We have:

$$
\begin{array}{r|l}
2 & 36, 60, 72 \\
\hline
2 & 18, 30, 36 \\
\hline
3 & 9, 15, 18 \\
\hline
3 & 3, 5, 6 \\
\hline
5 & 1, 5, 2 \\
\hline
2 & 1, 1, 2 \\
\hline
 & 1, 1, 1
\end{array}
$$

$\therefore$ LCM = 2 × 2 × 2 × 3 × 3 × 5
= 360

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Question 5:

Find the LCM of the numbers given below:
36, 40, 126

ANSWER:

The given numbers are 36, 40 and 126.

We have:

$$
\begin{array}{r|l}
2 & 36, 40, 126 \\
\hline
3 & 18, 20, 63 \\
\hline
3 & 6, 20, 21 \\
\hline
2 & 2, 20, 7 \\
\hline
2 & 1, 10, 7 \\
\hline
5 & 1, 5, 7 \\
\hline
7 & 1, 1, 7 \\
\hline
 & 1, 1, 1
\end{array}
$$

$\therefore$ LCM = 2 × 3 × 3 ×2 × 2 × 5 × 7

$= 2520$

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Question 6:

Find the LCM of the numbers given below:
16, 28, 40, 77

ANSWER:

The given numbers are 16, 28, 40 and 77.
We have:

$$\begin{array}{r|l} 2 & 16, 28, 40, 77 \\ \hline 7 & 8, 14, 20, 77 \\ \hline 2 & 8, 2, 20, 11 \\ \hline 2 & 4, 1, 10, 11 \\ \hline 2 & 2, 1, 5, 11 \\ \hline 5 & 1, 1, 5, 11 \\ \hline 11 & 1, 1, 1, 11 \\ \hline & 1, 1, 1, 1 \end{array}$$

$\therefore$ LCM = 2 × 7 × 2 × 2 × 2 × 5 × 11
= 6160

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Question 7:

Find the LCM of the numbers given below:
28, 36, 45, 60

ANSWER:

The given numbers are 28, 36, 45 and 60.

We have:

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

$\therefore$ LCM = 2 × 2 × 3 × 3 × 5 × 7
= 1260

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Question 8:

Find the LCM of the numbers given below:
144, 180, 384

ANSWER:

The given numbers are 144, 180 and 384.
We have:

$$
\begin{array}{r|l}
2 & 144, 180, 384 \\
\hline
2 & 72, 90, 192 \\
\hline
2 & 36, 45, 96 \\
\hline
2 & 18, 45, 48 \\
\hline
3 & 9, 45, 24 \\
\hline
3 & 3, 15, 8 \\
\hline
2 & 1, 5, 8 \\
\hline
2 & 1, 5, 4 \\
\hline
2 & 1, 5, 2 \\
\hline
5 & 1, 5, 1 \\
\hline
 & 1, 1, 1
\end{array}
$$

$\therefore$ LCM = $2^7 \times 3^2 \times 5$
= 5760

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Question 9:

Find the LCM of the numbers given below:
48, 64, 72, 96, 108

ANSWER:

The given numbers are 48, 64, 72, 96 and 108.
We have:

$2 \mid 48, 64, 72, 96, 108$
$2 \mid 24, 32, 36, 48, 54$
$2 \mid 12, 16, 18, 24, 27$
$2 \mid 6, 8, 9, 12, 27$
$3 \mid 3, 4, 9, 6, 27$
$2 \mid 1, 4, 3, 2, 9$
$2 \mid 1, 2, 3, 1, 9$
$3 \mid 1, 1, 3, 1, 9$
$3 \mid 1, 1, 1, 1, 3$
$1,1,1,1,1$

$\therefore$ LCM = $2^6 \times 3^3$
= 1728

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Question 10:

Find the HCF and LCM of
117, 221

ANSWER:

The given numbers are 117 and 221.

We have:

$$\begin{array}{r|l} 3 & 117 \\ \hline 3 & 39 \\ \hline 13 & 13 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 13 & 221 \\ \hline 17 & 17 \\ \hline & 1 \end{array}$$

Now,
117 = 3 × 3 × 13
221 = 13 × 17

∴ HCF = 13 × 1

Now, LCM = 13 × 17 × 3 × 3
= 1989

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Question 11:

Find the HCF and LCM of
234, 572

ANSWER:

The given numbers are 234 and 572.

We have:

$$\begin{array}{r|l} 2 & 234 \\ \hline 3 & 117 \\ \hline 3 & 39 \\ \hline 13 & 13 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 2 & 572 \\ \hline 2 & 286 \\ \hline 13 & 143 \\ \hline 11 & 11 \\ \hline & 1 \end{array}$$

Now, we have:

234 = 2 × 3 × 3 × 13
572 = 2 × 2 × 1 3 × 11

∴ LCM = 13 × 2 × 2 × 11 × 9
= 5148
Also, HCF = 13 × 2 = 26

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Question 12:

Find the HCF and LCM of
693, 1078

ANSWER:

The given numbers are 693 and 1078.

We have:

$$\begin{array}{r|l} 3 & 693 \\ \hline 3 & 231 \\ \hline 7 & 77 \\ \hline 11 & 11 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 2 & 1078 \\ \hline 7 & 539 \\ \hline 7 & 77 \\ \hline 11 & 11 \\ \hline & 1 \end{array}$$

Now, we have:

693 = 3 × 3 ×7 × 11
1078 = 2 × 7× 7 × 11

∴ HCF = 7 × 11= 77
Also, LCM = 2 × 3 × 3 ×7 × 7 × 11 = 9702

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Question 13:

Find the HCF and LCM of
145, 232

ANSWER:

The given numbers are 145 and 232.
We have:

$$\begin{array}{r|l} 5 & 145 \\ \hline 29 & 29 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 2 & 232 \\ \hline 2 & 116 \\ \hline 2 & 58 \\ \hline 29 & 29 \\ \hline & 1 \end{array}$$

Now, we have:

145 = 5 × 29
232 = 2 ×2 × 2 × 29

∴ HCF = 29
Also, LCM = 29 × 2 × 2 × 2 × 5 = 1160

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Question 14:

Find the HCF and LCM of
861, 1353

ANSWER:

The given numbers are 861 and 1353.

We have:

$$\begin{array}{r|l} 3 & 861 \\ \hline 7 & 287 \\ \hline 41 & 41 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 3 & 1353 \\ \hline 11 & 451 \\ \hline 41 & 41 \\ \hline & 1 \end{array}$$

Now, we have:

861 = 3 × 41 × 7
1353 = 41 × 11 × 3

$\therefore$ HCF = 41 × 3 = 123
Also, LCM = 41 × 3 × 11 × 7 = 9471

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Question 15:

Find the HCF and LCM of
2923, 3239

ANSWER:

HCF of 2923 and 3239:

$$
\begin{array}{r}
1 \\
2923\overline{)\,3239} \\
-2923 \\
\hline
316\overline{)\,2923}\,(9 \\
-2844 \\
\hline
79\overline{)\,316}\,(4 \\
-316 \\
\hline
0
\end{array}
$$

$\therefore$ HCF = 79

We know that product of two numbers = HCF × LCM

$$\Rightarrow \text{LCM} = \frac{\text{Product of two numbers}}{\text{HCF}}$$
$$\Rightarrow \text{LCM} = \frac{2923 \times 3239}{79}$$

$$\therefore \text{LCM} = 119843$$

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Question 16:

For each pair of numbers, verify that their product = (HCF × LCM).
(i) 87, 145
(ii) 186, 403
(iii) 490, 1155

ANSWER:

(i) 87 and 145

3	87
29	29
	1

5	145
29	29
	1

We have:
$87 = 3 \times 29$
$145 = 5 \times 29$

HCF = 29
LCM = $29 \times 15 \times 1 = 435$

Now, HCF × LCM = $29 \times 435 = 12615$
Product of the two numbers = $87 \times 145 = 12615$

$\therefore$ HCF × LCM = Product of the two numbers
Verified.

(ii)186 and 403

2	186
3	93
31	31
	1

13	403
31	31
	1

$186 = 2 \times 3 \times 31$
$403 = 31 \times 13$

HCF = 31
LCM = $31 \times 13 \times 6 = 2418$

Now, HCF × LCM = $31 \times 2418 = 74958$
Product of the two numbers = $186 \times 403 = 74958$

$\therefore$ HCF × LCM = Product of the two numbers
Verified.

(iii) 490 and 1155

2	490
5	245
7	49
7	7
	1

5	1155
7	231
3	33
11	11
	1

$490 = 7 \times 7 \times 2 \times 5$
$1155 = 5 \times 7 \times 3 \times 11$

HCF = 7 × 5 = 35
LCM = 7 × 5 ×7 × 2 × 3 × 11 = 16170

Now, HCF × LCM = 35 × 16170 = 565950
Product of the two numbers = 490 × 1155 = 565950

∴ HCF × LCM = Product of the two numbers
Verified.

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Question 17:

The product of two numbers is 2160 and their HCF is 12. Find their LCM.

ANSWER:

Product of the two numbers = 2160
HCF = 12

We know that LCM × HCF = Product of the two numbers

$\therefore \text{LCM} = \frac{2160}{12} = 180$

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Question 18:

The product of two numbers is 2160 and their LCM is 320. Find their HCF.

ANSWER:

Product of the two numbers = 2560
LCM = 320

We know that

LCM × HCF = Product of the two numbers

$\therefore \text{HCF} = \frac{2560}{320} = 8$

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Question 19:

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

ANSWER:

HCF = 145
LCM = 2175
One of the number = 725

We know that
HCF × LCM = Product of two numbers
$\therefore$ Other number = $\frac{145\times2175}{725}$ = 435

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Question 20:

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

ANSWER:

HCF = 131
LCM = 8253
One of the number = 917

We know that
LCM × HCF = Product of two numbers
Other number = $\frac{8253\times131}{917}$

$\therefore$ The other number is 1179.

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Question 21:

Find the least number divisible by 15, 20, 24, 32 and 36.

ANSWER:

The given numbers are 15, 20, 24, 32 and 36.

The smallest number divisible by the numbers given above will be their LCM.

$$
\begin{array}{r|l}
2 & 15, 20, 24, 32, 36 \\
3 & 15, 10, 12, 16, 18 \\
5 & 5, 10, 4, 16, 6 \\
2 & 1, 2, 4, 16, 6 \\
2 & 1, 1, 2, 8, 3 \\
2 & 1, 1, 1, 4, 3 \\
2 & 1, 1, 1, 2, 3 \\
3 & 1, 1, 1, 1, 3 \\
 & 1, 1, 1, 1, 1
\end{array}
$$

$\text{LCM} = 2^5 \times 3^2 \times 5$

$= 1440$

$\therefore$ The least number divisible by 15, 20, 24, 32 and 36 is 1440.

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Question 22:

Find the least number which when divided by 25, 40 and 60 leaves 9 as the remainder in each case.

ANSWER:

25, 40 and 60 exactly divides the least number that is equal to their LCM.
So, the required number that leaves 9 as a remainder will be LCM + 9.

Finding the LCM:

$2 \mid 25, 40, 60$

$2 \mid 25, 20, 30$

$2 \mid 25, 10, 15$

$3 \mid 25, 5, 15$

$5 \mid 25, 5, 5$

$5 \mid 5, 1, 1$

$1, 1, 1$

LCM $= 2^3 \times 3 \times 5^2 = 600$

$\therefore$ Required number $= 600 + 9 = 609$

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Question 23:

Find the least number of five digits that is exactly divisible by 16, 18, 24 and 30.

ANSWER:

LCM of 16, 18, 24 and 30:

$2 \mid 16, 18, 24, 30$

$2 \mid 8, 9, 12, 15$

$2 \mid 4, 9, 6, 15$

$2 \mid 2, 9, 3, 15$

$3 \mid 1, 9, 3, 15$

$3 \mid 1, 3, 1, 5$

$5 \mid 1, 1, 1, 5$

1,1,1,1

LCM $= 2^4 \times 3^2 \times 5 = 720$

We have to find the least five-digit number that is exactly divisible by 16, 18, 24 and 30.
But LCM=720 is a three digit number.

The least five digit number = 10000
Dividing 10000 by 720, we get:

$$
\begin{array}{r}
13 \\
720\overline{)\ 10000} \\
\underline{-720} \\
2800 \\
\underline{-\ 2160} \\
640
\end{array}
$$

The greatest four-digit number exactly divisible by $720 = 10000\text{-}640$
$=9360$

So, the least five-digit number exactly divisible by $720 = 9360 + 720$
$= 10080$

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Question 24:

Find the greatest number of five digits exactly divisible by 9, 12, 15, 18 and 24.

ANSWER:

First, we will find the LCM of 9, 12, 15, 18 and 24.

$2 \mid 9, 12, 15, 18, 24$

$2 \mid 9, 6, 15, 9, 12$

$2 \mid 9, 3, 15, 9, 6$

$3 \mid 9, 3, 15, 9, 3$

$3 \mid 3, 1, 5, 3, 1$

$5 \mid 1,1,5,1,1$

$1,1,1,1,1$

$\therefore$ LCM of the numbers $= 2^3 \times 3^2 \times 5$

$= 360$

The least six-digit number $= 100000$

The greatest five-digit number divisible by 360

will be the quotient of $\frac{100000}{360}$ mutiplied by 360.

$$360 \overline{)100000} \quad 277$$

$\frac{720}{2800}$

$\frac{2520}{280}$

So, the greatest five-digit number exactly divisible

by the given numbers will be

$360 \times 277 = 99720$

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Question 25:

Three bells toll at intervals of 9, 12, 15 minutes. If they start tolling together, after what time will they next toll together?

ANSWER:

Three bells toll at intervals of 9, 12 and, 15 minutes.

The time when they will toll together again is given by the LCM of 9, 12 and 15.

$3 \mid 9, 12, 15$

$3 \mid 3, 4, 5$

$5 \mid 1, 4, 5$

$2 \mid 1, 4, 1$

$2 \mid 1, 2, 1$

$1,1,1$

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

$= 180$ minutes

$= 3$ h

If they start tolling together, they will toll together again after 3 h.

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Question 26:

Three boys step off together from the same place. If their steps measure 36 cm, 48 cm and 54 cm, at what distance from the starting point will they again step together?

ANSWER:

From the starting point, they will step together again when they travel a distance that is exactly divisible by the lengths of their steps.
The least distance from the starting point where they will step together will be given by the LCM of 36, 48 and 54.

$2 \mid 36, 48, 54$

$2 \mid 18, 24, 27$

$3 \mid 9, 12, 27$

$3 \mid 3, 4, 9$

$3 \mid 1, 4, 3$

$2 \mid 1, 4, 1$

$2 \mid 1, 2, 1$

$1,1,1$

The required distance $= 2 \times 2 \times 3 \times 3 \times 3 \times 2 \times 2$

$= 16 \times 27$

$= 432$ cm

∴ They will step together again at a distance of 432 cm from the starting point.

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Question 27:

The traffic lights at three different road crossings change after every 48 seconds, 72 seconds and 108 seconds. If they start changing simultaneously at 8 a.m., after how much time will they change again simultaneously?

ANSWER:

The time when the lights will change simultaneously again will be quantity which is exactly divisible by 48, 72 and 108. The least time when they change simultaneously will be given by their LCM.

$2 \mid 48, 72, 108$

$2 \mid 24, 36, 54$

$2 \mid 12, 18, 27$

$2 \mid 6, 9, 27$

$3 \mid 3, 9, 27$

$3 \mid 1, 3, 9$

$3 \mid 1, 1, 3$

$1, 1, 1$

Required time $= 2^4 \times 3^3$

$= 432$ seconds

$= 7$ min 12 seconds

So, the lights will change simultaneously at 8:07:12 a.m.

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Question 28:

Three measuring rods are 45 cm, 50 cm and 75 cm in length. What is the least length (in metres) of a rope that can be measured by the full length of each of these three rods?

ANSWER:

The length of the required rope must be such that it is exactly divisible by 45, 50 and 75. The least length will be given by the LCM of 45, 50 and 75.

$$\begin{array}{r|l} 2 & 45, 50, 75 \\ \hline 3 & 45, 25, 75 \\ \hline 3 & 15, 25, 25 \\ \hline 5 & 5, 25, 25 \\ \hline 5 & 1, 5, 5 \\ \hline & 1, 1, 1 \end{array}$$

$$\text{Required length} = 3 \times 3 \times 5 \times 5 \times 2$$
$$= 450 \text{ cm}$$

So, the minimum length of the rope that can be measured by the full length of each of the three rods is 450 cm.

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Question 29:

An electronic device makes a beep after every 15 minutes. Another device makes a beep after every 20 minutes. They beeped together at 6 a.m. At what time will they next beep together?

ANSWER:

The LCM of the time intervals of the beeps will give the time when the electronic devices will beep together.

LCM of 15 and 20:

$$\begin{array}{r|l} 5 & 15, 20 \\ \hline 3 & 3, 4 \\ \hline 2 & 1, 4 \\ \hline 2 & 1, 2 \\ \hline & 1, 1 \end{array}$$

$$\text{Required time} = 5 \times 3 \times 2 \times 2$$
$$= 60 \text{ min}$$

So, they will beep simultaneously after 60 min or 1 h.

∴ They will beep together again at 7:00 a.m.

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Question 30:

The circumferences of four wheels are 50 cm, 60 cm, 75 cm and 100 cm. They start moving simultaneously. What least distance should they cover so that each wheel makes a complete number of revolutions?

ANSWER:

Distance covered by a wheel for one complete revolution = circumference of the wheel

All the wheels will make complete numbers of revolutions when the distances covered by them is equal to their LCM.

$5 \mid 50, 60, 75, 100$

$5 \mid 10, 12, 15, 20$

$2 \mid 2, 12, 3, 4$

$2 \mid 1, 6, 3, 2$

$3 \mid 1, 3, 3, 1$

$1, 1, 1, 1$

Required least distance $= 5 \times 5 \times 2 \times 2 \times 3$

$= 25 \times 4 \times 3$

$= 300 \text{ cm} = 3 \text{ m}$

So, each wheel will make a complete number of revolutions after travelling 3 m.

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Question 1:

Which of the following numbers is divisible by 3?
(a) 24357806
(b) 35769812
(c) 83479560

(d) 3336433

ANSWER:

(c) 83479560

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

a) Consider the number 24357806.
Sum of its digits = 2 + 4 + 3 + 5+ 7 + 8 + 0 + 6 = 35, which is not divisible by 3.
So, 2357806 is not divisible by 3.

b) Consider the number 35769812.
Sum of its digits = 3 + 5 + 7 + 6 +9 + 8 + 1 + 2 = 41, which is not divisible by 3.
So, 35769812 is not divisible by 3.

c) Consider the number 83479560.
Sum of its digits = 8 + 3 + 4+ 7 + 9 + 5 + 6 + 0 = 42, which is divisible by 3.
So, 2357806 is divisible by 3.

d) Consider the number 3336433.
Sum of its digits = 3 + 3 +3 + 6 +4 + 3 +3 = 25, which is not divisible by 3.
So, 3336433 is not divisible by 3.

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Question 2:

Which of the following numbers is divisible by 9?
(a) 8576901
(b) 96345210
(c) 67594310
(d) none of these

ANSWER:

(a) 8576901

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

a) Consider the number 8576901.
Sum of its digits = 8 + 5 +7 + 6 + 9+ 0 + 1 = 36, which is divisible by 9.
So, 8576901 is divisible by 9.

b) Consider the number 96345210.

Sum of its digits = 9 + 6 + 3+ 4 + 5+ 2 + 1 + 0 = 30, which is not divisible by 9.
So, 96345210 is not divisible by 9.

c) Consider the number 67594310.
Sum of its digits = 6 + 7 + 5 + 9 + 4 + 3 + 1 + 0 = 35, which is not divisible by 9.
So, 67594310 is not divisible by 9.

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Question 3:

Which of the following numbers is divisible by 4?
(a) 78653234
(b) 98765042
(c) 24689602
(d) 87941032

ANSWER:

(d)87941032

A number is divisible by 4 if the number formed by its digits in the tens and ones places is divisible by 4.

(a) 78653234
Consider the number 78653234.
Here, the number formed by the tens and the ones digit is 34, which is not divisible by 4.
Therefore, 78653234 is not divisible by 4.

(b) 98765042
Consider the number 98765042.
Here, the number formed by the tens and the ones digit is 42, which is not divisible by 4.
Therefore, 98765042 is not divisible by 4.

(c) 24689602
Consider the number 24689602.
Here, the number formed by the tens and the ones digit is 02, which is not divisible by 4.
Therefore, 24689602 is not divisible by 4

(d) 87941032
Consider the number 87941032.
Here, the number formed by the tens and ones digit is 32, which is divisible by 4.
Therefore, 87941032 is divisible by 4.

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Question 4:

Which of the following numbers is divisible by 8?
(a) 96354142
(b) 37450176
(c) 57064214
(d) none of these

ANSWER:

(b) 37450176

A number is divisible by 8 if the number formed by its digits in hundreds, tens and ones places is divisible by 8.

(a) 96354142
Consider the number 96354142.
Here, the number formed by the digits in hundreds, tens and ones places is 142, which is clearly not divisible by 8.
Therefore, 96354142 is not divisible by 8.

(b) 37450176
Consider the number 37450176.
The number formed by the digits in hundreds, tens and ones places is 176, which is clearly divisible by 8.
Therefore, 37450176 is divisible by 8.

(c) 57064214
Consider the number 57064214.
Here, the number formed by the digits in hundreds, tens and ones places is 214, which is clearly not divisible by 8.
Therefore, 57064214 is not divisible by 8.

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Question 5:

Which of the following numbers is divisible by 6?
(a) 8790432
(b) 98671402
(c) 85492014
(d) none of these

ANSWER:

(a) 8790432 and (c) 85492014

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

(a) 8790432
Consider the number 8790432.
The number in the ones digit is 2.
Therefore, 8790432 is divisible by 2.
Now, the sum of its digits (8+7+9+0+2+3+2) is 33. Since 33 is divisible by 3, we can say that 8790432 is also divisible by 3.
Since 8790432 is divisible by both 2 and 3, it is also divisible by 6.

(b) 98671402
Consider the number 98671402.
The number in the ones digit is 2.
Therefore, 98671402 is divisible by 2.
Now, the sum of its digits (9+8+6+7+1+4+0+2) is 37. Since 37 is not divisible by 3, we can say that 98671402 is also not divisible by 3.
Since 98671402 is not divisible by both 2 and 3, it is not divisible by 6.

(c) 85492014
Consider the number 85492014.
The number in the ones digit is 4.
Therefore, 85492014 is divisible by 2.
Now, the sum of its digits (8+5+4+9+2+0+1+4) is 33. Since 33 is divisible by 3, we can say that 85492014 is also divisible by 3.
Since 85492014 is divisible by both 2 and 3, it is also divisible by 6.

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Question 6:

Which of the following numbers is divisible by 11?
(a) 3333333
(b) 1111111
(c) 22222222
(d) none of these

ANSWER:

(c) 22222222
A number is divisible by 11, if the difference of the sum of its digits in odd places and the

sum of the digits in even places (starting from ones place) is either 0 or a multiple of 11.

(a) 3333333
Consider the number 3333333.
Sum of its digits in odd places (3 + 3 + 3 + 3) = 12
Sum of its digits in even places (3 + 3 + 3) = 9
Difference of the two sums = 12 − 9 = 3
Since this number (3) is not divisible by 11, 3333333 is not divisible by 11.

(b) 1111111
Consider the number 1111111.
Sum of its digits in odd places (1 + 1 + 1 + 1) = 4
Sum of its digits in even places (1 + 1 + 1) = 3
Difference of the two sums = 4 − 3 = 1
Since this number (1) is not divisible by 11, 1111111 is also not divisible by 11.

(c) 22222222
Consider the number 22222222.
Sum of its digits in odd places (2 + 2 + 2 + 2)= 8
Sum of its digits in even places (2 + 2 + 2 + 2) = 8
Difference of the two sums = 8 − 8 = 0
Since this number (0) is divisible by 11, 22222222 is also divisible by 11.

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Question 7:

Which of the following is a prime number?
(a) 81
(b) 87
(c) 91
(d) 97

ANSWER:

(d) 97

(a) 81 is not a prime number because 81 can be written as 9×9.
(b) 87 is not a prime number because 87 can be written as 29×3.
(c) 91 is not a prime number because 91 can be written as 13×7.
(d) 97 is a prime number.

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Question 8:

Which of the following is a prime number?
(a) 117
(b) 171
(c) 179
(d) none of these

ANSWER:

(c) 179

(a) 117 is not a prime number because 117 can be written as 3 × 39.
(b) 171 is not a prime number because 171 can be written as 19×9.
(c) 179 is prime number.

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Question 9:

Which of the following is a prime number?
(a) 323
(b) 361
(c) 263
(d) none of these

ANSWER:

(c)263

(a) 323 is not a prime number because 323 can be written as 17 × 19.
(b) 361 is not a prime number because 361 can be written as 19 × 19.
(c) 263 is a prime number.

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Question 10:

Which of the following are co-primes?
(a) 8, 12
(b) 9, 10
(c) 6, 8
(d) 15, 18

ANSWER:

(b) 9, 10

(a) 8, 12 are not co-primes as they have a common factor 4.
(b) 9, 10 are co-primes as they do not have a common factor.
(c) 6, 8 are not co-primes as they have a common factor 2.
(d)15,18 are not co-primes as they have a common factor 3.

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Question 11:

Which of the following is a composite number?
(a) 23
(b) 29
(c) 32
(d) none of these

ANSWER:

(c) 32

(a) 23 is not a composite number as it cannot be broken into factors.
(b) 29 is not a composite number as it cannot be broken into factors.
(c) 32 is a composite number as it can be broken into factors, which are $2 \times 2 \times 2 \times 2 \times 2$.

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Question 12:

The HCF of 144 and 198 is
(a) 9
(b) 12
(c) 6
(d) 18

ANSWER:

(d) $2 \times 3^2 = 18$
We first factorise the two numbers:

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

2	198
3	99
3	33
11	11
	1

$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 2^4 \times 3^2$

$198 = 2 \times 3 \times 3 \times 11 = 2 \times 3^2 \times 11$

Here, 18 ($2 \times 3^2 = 18$) is the highest common factor of the two numbers.

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Question 13:

The HCF of 144, 180 and 192 is

(a) 12

(b) 16

(c) 18

(d) 8

ANSWER:

(a) $2^2 \times 3 = 12$

We will first factorise the two numbers:

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

2	180
2	90
3	45
3	15
5	5
	1

2	192
2	96
2	48
2	24
2	12
2	6
3	3
	1

$144 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 2^4 \times 3^2$

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

$192 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 = 2^6 \times 3$

Here, 12 (i.e. $2^2 \times 3 = 12$) is the highest common factor of the three numbers.

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Question 14:

Which of the following are co-primes?
(a) 39, 91
(b) 161, 192
(c) 385, 462
(d) none of these

ANSWER:

(b) 161 and 192

(a) 39 and 91 are not co-primes as 39 and 91 have a common factor, i.e. 13.
(b) 161 and 192 are co-primes as 161 and 192 have no common factor other than 1.
(c) 385 and 462 are not co-primes as 385 and 462 have common factors 7 and 11.

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Question 15:

$\frac{289}{391}$ when reduced to the lowest terms is
(a) $\frac{11}{23}$
(b) $\frac{13}{31}$
(c) $\frac{17}{31}$
(d) $\frac{17}{23}$

ANSWER:

(d) $\frac{17}{23}$

$\frac{289}{391}$

H.C.F.=17

Dividing both the numerator and the denominator by the H.C.F. of 289 & 391:

17	289
17	17
	1

17	391
23	23
	1

$\frac{289 \div 17}{391 \div 17} = \frac{17}{23}$

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Question 16:

The greatest number which divides 134 and 167 leaving 2 as remainder in each case is
(a) 14
(b) 17
(c) 19
(d) 33

ANSWER:

(d) 33
Since we need 2 as the remainder, we will subtract 2 from each of the numbers.
167 − 2 = 165
134 − 2 = 132
Now, any of the common factors of 165 and 132 will be the required divisor.
On factorising:
165 = 3 × 5 × 11
132 = 2 × 2 × 3 × 11
Their common factors are 11 and 3.
So, 3 × 11 = 33 is the required divisor.

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Question 17:

The LCM of 24, 36, 40 is
(a) 4
(b) 90
(c) 360
(d) 720

ANSWER:

(c) 360

$2 \mid 24, 36, 40$

$2 \mid 12, 18, 20$

$2 \mid 6, \quad 9, 10$

$3 \mid 3, \ 9, \quad 5$

$3 \mid 1, \ 3, \quad 5$

$5 \mid 1, \ 1, \quad 5$

$1, \ 1, \quad 1$

L.C.M. = $2^3 \times 3^2 \times 5$
= 360

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Question 18:

The LCM of 12, 15, 20, 27 is
(a) 270
(b) 360
(c) 480
(d) 540

ANSWER:

(d) 540

$2 \mid 12, 15, 20, 27$

$2 \mid 6, 15, 10, 27$

$3 \mid 3,15, 5, 27$

$3 \mid 1, 5, 5, \ 9$

$3 \mid 1, 5, 5, \ 3$

$5 \mid 1, 5, 5, \ 1$

$1, 1, 1, 1$

L.C.M. = $2^2 \times 3^3 \times 5 = 540$

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Question 19:

The smallest number which when diminished by 3 is divisible by 14, 28, 36 and 45, is
(a) 1257
(b) 1260
(c) 1263
(d) none of these

ANSWER:

(c) 1263

The smallest number that is exactly divisible by 14, 28, 36 and 45 will be their L.C.M.
So, the required number will be the L.C.M. plus 3.

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

L.C.M. of the three numbers = $2^2 \times 3^2 \times 5 \times 7$
$= 1260$
$\therefore$ Required number = 1260 + 3 = 1263

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Question 20:

The HCF of two co-primes is
(a) the smaller number
(b) the larger number
(c) 1
(d) none of these

ANSWER:

(c) 1

H.C.F. of two co-primes is 1.
This is because two co-prime numbers do not have any common factor.
For example, 15 and 16 are co-primes.
Their H.C.F. is 1.

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Question 21:

If *a* and *b* are co-primes, then their LCM is
(a) 1
(b) $\frac{a}{b}$
(c) *ab*
(d) none of these

ANSWER:

(c) *ab*

If *a* and *b* are co-primes then their LCM will be ab.
For example, 4 and 9 are co-primes.
L.C.M. of 4 and 9 is 4×9.

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Question 22:

The product of two numbers is 2160 and their HCF is 12. The LCM of these numbers is
(a) 12
(b) 25920
(c) 180
(d) none of these

ANSWER:

(c) 180
Here, H.C.F. = 12
Product of two numbers = 2160

We know:
L.C.M. × H.C.F. = Product of the two numbers

L.C.M. $= \frac{2160}{\text{H.C.F.}}$

$= \frac{2160}{12}$

$= 180$

L.C.M. = 180

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Question 23:

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

(a) 290

(b) 435

(c) 5

(d) none of these

ANSWER:

(b) 435

One of the numbers is 725.

H.C.F. = 145

L.C.M. = 2175

We know:

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

∴ Product of the two numbers = 145 × 2175

= 315375

∴ Other number $= \frac{315375}{725}$

= 435

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Question 24:

The least number divisible by each of the numbers 15, 20, 24, 32 and 36 is

(a) 1660

(b) 2880

(c) 1440

(d) none of these

ANSWER:

(c) 1440

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

$2 \mid 15, 20, 24, 32, 36$

$2 \mid 15, 10, 12, 16, 18$

$2 \mid 15, 5, 6, 8, 9$

$2 \mid 15, 5, 3, 4, 9$

$2 \mid 15, 5, 3, 2, 9$

$3 \mid 15, 5, 3, 1, 9$

$3 \mid 5, 5, 1, 1, 3$

$5 \mid 5, 5, 1, 1, 1$

$1, 1, 1, 1, 1$

L.C.M. = $2^5 \times 3^2 \times 5$

= 1440

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Question 25:

Three bells toll together at intervals of 9, 12, 15 minutes. If they start tolling together, after what time will they next toll together?

(a) 1 hour

(b) $1\frac{1}{2}$ hours

(c) $2\frac{1}{2}$ hours

(d) 3 hours

ANSWER:

(d) 3 hours

The L.C.M. of 9, 12 and 15 will give us the minutes after which the bells will next toll together.

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

L.C.M. = $2^2 \times 3^2 \times 5$

= 180

So,the bells will toll together after 180 min.

On converting into hours:

180/60 = 3 hours

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Question 1:

Test the divisibility of 5869473 by 11.

ANSWER:

5869473

A number is divisible by 11 if the the difference of the sums of the digits at the odd places and that at the even places (starting from ones place) is either 0 or a multiple of 11.

Sum of the digits at even places = 7 + 9 + 8

= 24

Sum of the digits in odd places = 3 + 4 + 6 + 5

= 18

Difference = 24−18

= 6

Since 6 is not divisible by 11, 5869473 is not divisible by 11.

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Question 2:

Test the divisibility of 67529124 by 8.

ANSWER:

67529124

A number is divisible by 8 if the number formed by the hundreds, tens and ones digits is divisible by 8.

Since the digits at the hundred's, ten's and unit places are 124, which is not divisible by 8, 67529124 is not divisible by 8.

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Question 3:

On dividing 5035 by 31, the remainder is 13. Find the quotient.

ANSWER:

Remainder is 13

$\therefore$ Number exactly divisible by 31 = 5035 − 13

= 5022

$$\begin{array}{r} 162 \\ 31\overline{)\,5022} \\ -31 \\ \hline 192 \\ -186 \\ \hline 62 \\ -62 \\ \hline 0 \end{array}$$

So, the required quotient is 162.

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Question 4:

The HCF of two number is 15 and their product is 1650. Find their LCM.

ANSWER:

H.C.F. × L.C.M. = Products of the two numbers

Product of the two numbers = 1650

H.C.F. = 15

Required L.C.M. $= \frac{1650}{15}$

$= 110$

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Question 5:

Find the least 5-digit number which is exactly divisible by 20, 25, 30.

ANSWER:

Least five digit number = 10000

5	20, 25, 30
2	4, 5, 6
2	2, 5, 3
3	1, 5, 3
5	1, 5, 1
	1, 1, 1

L.C.M. of 20,25,30 is 300.

But we want the least five digit number which is divisible by 20, 25, 30.

So, we will multiply the L.C.M. by a number that makes it the least five digit number divisible by 20, 25, 30.

$300 \times 31 = 9300$

$300 \times 32 = 9600$

$300 \times 33 = 9900$

$300 \times 34 = 10200$

So, the least five digit number divisible by 20, 25, 30 is 10200.

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Question 6:

Find the largest number which divides 630 and 940 leaving remainders 6 and 4 respectively.

ANSWER:

Since 6 and 4 are the remainders, the number must exactly divide the following:

630 – 6 = 624
and
940 – 4 = 936

3	642
2	208
2	104
2	52
2	26
13	13
	1

3	936
2	312
2	156
2	78
3	39
13	13
	1

$624 = 2 \times 2 \times 2 \times 2 \times 3 \times 13$
$936 = 2 \times 2 \times 2 \times 3 \times 3 \times 13$
H.C.F. of 624 and 936 $= 8 \times 3 \times 13$
$= 312$
So, 312 is the greatest number that divides 630 and 940, leaving 6 and 4 as the respective remainders.

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Question 7:

Find the least number which when divided by 16, 36 and 40 leaves 5 as remainder in each case.

ANSWER:

On subtracting 5 from each number:
$16 - 5 = 11$
$36 - 5 = 31$
$40 - 5 = 35$
The required number will be the least common multiple of 11, 31 and 35.
L.C.M. of 11, 31 and $35 = 11 \times 31 \times 35$
$= 11935$
This is because they do not have any factor in common.
So, 11935 is the required number.

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Question 8:

Write all prime numbers between 50 and 100.

ANSWER:

53, 59, 61, 67, 71, 73, 79, 83, 89, 97 are the prime numbers between 50 and 100.

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Question 9:

Write seven consecutive composite numbers less than 100 having no prime number between them.

ANSWER:

Seven consecutive composite numbers less than 100 having no prime number between them are 90, 91, 92, 93, 94, 95 and 96.

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Question 10:

Can two numbers have 12 as their HCF and 512 as their LCM? Justify your answer.

ANSWER:

No, they cannot have 512 as their L.C.M.

We know that the H.C.F. is one of the factors of the L.C.M. Here, 3, which is a factor of 12, is not a factor of 512.

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Question 11:

Which of the following are co-primes?
(a) 91 and 72
(b) 34 and 51

(c) 21 and 36
(d) 15 and 20

ANSWER:

The correct option is (a).
The H.C.F. of 72 and 91 is 1.
So, they are co-primes.

Option (b) is not correct because 34 and 51 have 17 as their H.C.F.
Option (c) is not correct because 21 and 56 have 3 as their H.C.F.
Option (d) is not correct because 15 and 20 have 5 as their H.C.F.

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Question 12:

The LCM of two co-prime numbers is their
(a) sum
(b) difference
(c) product
(d) quotient

ANSWER:

The correct option is (c).
The L.C.M of two co-prime numbers is their product.

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Question 13:

The number which is neither prime nor composite is
(a) 0
(b) 1
(c) 2
(d) 3

ANSWER:

The correct option is (b).
1 is neither prime nor composite.

Option (a) is not correct because composite numbers are defined for positive numbers, but 0 is neither a positive number nor a negative number.
Option (c) is not correct because 2 is a prime number.
Option (d) is not correct because 3 is a prime number.

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Question 14:

What least number should be replaced for * so that the number 67301*2 is exactly divisible by 9?
(a) 5
(b) 6
(c) 7
(d) 8

ANSWER:

The correct option is (d).

6 + 7 + 3 + 0 + 1 + * + 2 = 19 + *
8 is the least number that should be added to 19 such that number will be divisible by 9.
Sum of the digits:
6 + 7 + 3 + 0 + 1 + 8 + 2 = 27
27 is divisible by 9.

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Question 15:

Which of the following numbers is divisible by 6?
(a) 67821
(b) 78134
(c) 87432
(d) none of these

ANSWER:

The correct option is (c).
A number is divisible by 6 if it is divisible by both 2 and 3.

Since the ones digit of 87432 is 2, it is divisible by 2.

Now, 8 + 7 + 4 + 3 + 2 = 24
24 is divisible by 3.
Hence, 87432 is divisible by 6 because it is divisible by both 2 and 3.

Option (a) is not correct because 67821 is not divisible by 2.
Option (b) is not correct because 78134 is not divisible by 3.
7 + 8 + 1 + 3 + 4 = 23
23 is not divisible by 3.

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Question 16:

Which of the following is a prime number?
(a) 143
(b) 131
(c) 147
(d) 161

ANSWER:

The correct option is (b).
To find a prime number between 100 and 200, we have to check whether the given number is divisible by any prime number less than 15. If yes, it is not prime, otherwise it is.
By examining, we find that 131 is a prime number.

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Question 17:

$\frac{289}{391}$ when reduced to lowest term is
(a) $\frac{13}{17}$
(b) $\frac{17}{19}$
(c) $\frac{17}{23}$
(d) $\frac{17}{21}$

ANSWER:

(c) $\frac{17}{23}$

17	289
1	17

17	391
23	23
	1

289 = 17 × 17
391 = 17 × 23
The H.C.F. of 289 and 391 is 17.

Dividing both the numerator and the denominator by 17:

$$\frac{289 \div 17}{391 \div 17}$$

$$= \frac{17}{23}$$

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Question 18:

Every counting number has an infinite number of
(a) factors
(b) multiples
(c) prime factors
(d) none of these

ANSWER:

The correct option is (b).

Every counting number has an infinite number of multiples.
If p is a counting number, its multiples are 1p, 2p, 3p....

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Question 19:

Fill in the blanks.
(i) 1 is neither ..... nor ..... .
(ii) The smallest prime number is ..... .
(iii) The smallest composite number is ..... .
(iv) The HCF of two consecutive odd numbers is ..... .
(v) Two perfect numbers are ..... and ..... .

ANSWER:

(i) prime, composite
(ii) 2
(iii) 4
(iv) 1
(v) 6, 28

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Question 20:

Write 'T' for true and 'F' for false statement.
(i) Every prime numbner is odd.
(ii) Every even number is composite.
(iii) The sum of two odd numbers is always odd.
(iv) The sum of two even numbers is always even.
(v) The HCF of two given numbers is always a factor is their LCM.

ANSWER:

(i) F
2 is an even prime number.
(ii) F
2 is an even number, but it is not composite.
(iii) F
The sum of two odd numbers is always even. For example, 9 and 11 are odd numbers, but their sum, i.e. 20, is an even number.
(iv) T
The sum of two even numbers is always even. For example, 4 and 10 are even numbers, and their sum, i.e. 14, is an even number.
(v) T
For example, 4 and 6 are two numbers whose H.C.F is 2 and L.C.M. is 12, but 2 is a factor of 12.

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