CBSE NCERT Solutions for Class 6 Mathematics Chapter 3

Back of Chapter Questions

Exercise 3.1

1. Write all the factors of the following numbers:

(A) 24

(B) 15

(C) 21

(D) 27

(E) 12

(F) 20

(G) 18

(H) 23

(I) 36

Solution:

(A) We can write,

$24 = 1 \times 24$

$24 = 2 \times 12$

$24 = 3 \times 8$

$24 = 4 \times 6$

$24 = 6 \times 4$

$\therefore$ Factors of $24 = 1, 2, 3, 4, 6, 12, 24$

(B) We can write,

$15 = 1 \times 15$

$15 = 3 \times 5$

$\therefore$ Factors of $15 = 1, 3, 5, 15$

(C) We can write,

$21 = 1 \times 21$

$21 = 3 \times 7$

$21 = 7 \times 3$

$\therefore$ Factors of $21 = 1, 3, 7, 21$

(D) We can write,

$27 = 1 \times 27$

$27 = 3 \times 9$

$27 = 9 \times 3$

$\therefore$ Factors of $27 = 1, 3, 9, 27$

(E) We can write,

$12 = 1 \times 12$

$12 = 2 \times 6$

$12 = 3 \times 4$

$12 = 4 \times 3$

$\therefore$ Factors of $12 = 1, 2, 3, 4, 6, 12$

(F) We can write,

$20 = 1 \times 20$

$20 = 2 \times 10$

$20 = 4 \times 5$

$20 = 5 \times 4$

$\therefore$ Factors of $20 = 1, 2, 4, 5, 10, 20$

(G) We can write,

$18 = 1 \times 18$

$18 = 2 \times 9$

$18 = 3 \times 6$

$\therefore$ Factors of $18 = 1, 2, 3, 6, 9, 18$

(H) We can write, $23 = 1 \times 23$

$\therefore$ Factors of $23 = 1, 23$

(I) We can write, $36 = 1 \times 36$

$36 = 2 \times 18$

$36 = 3 \times 12$

$36 = 4 \times 9$

$36 = 6 \times 6$

$\therefore$ Factors of $36 = 1, 2, 3, 4, 6, 9, 12, 18, 36$

2. Write first five multiples of:

(A) 5

(B) 8

(C) 9

Solution:

(A) $5 \times 1 = 5, 5 \times 2 = 10, 5 \times 3 = 15, 5 \times 4 = 20, 5 \times 5 = 25$

$\therefore$ First five multiples of 5 are $5, 10, 15, 20, 25$.

(B) $8 \times 1 = 8, 8 \times 2 = 16, 8 \times 3 = 24, 8 \times 4 = 32, 8 \times 5 = 40$

$\therefore$ First five multiples of 8 are $8, 16, 24, 32, 40$

(C) $9 \times 1 = 9, 9 \times 2 = 18, 9 \times 3 = 27, 9 \times 4 = 36, 9 \times 5 = 45$

$\therefore$ First five multiples of 9 are $9, 18, 27, 36, 45$.

3. Match the items in column 1 with the items in column 2:

Column 1		**Column 2**	
(i)	35	(A)	Multiple of 8
(ii)	15	(B)	Multiple of 7
(iii)	16	(C)	Multiple of 70
(iv)	20	(D)	Factor of 30
(v)	25	(E)	Factor of 50
		(F)	Factor of 20

Solution:

(i)→(b), (ii)→(d), (iii)→(a), (iv)→(f), (v)→(e)

(i) $35 = 5 \times 7$

(ii) $15 = \frac{30}{2}$

(iii) $16 = 8 \times 2$

(iv) $20 = 20 \times 1$

(v) $25 = \frac{50}{2}$

4. Find all the multiples of 9 up to 100.

Solution:

Multiples of 9 up to 100 are: $9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99$.

Exercise 3.2

1. What is the sum of any two

(A) Odd numbers?

(B) Even numbers?

Solution:

(A) The sum of any two odd numbers is an even number.

Example: $1 + 3 = 4, 3 + 5 = 8$

(B) The sum of any two even numbers is also an even number.

Example: $2 + 4 = 6, 6 + 8 = 14$

2. State whether the following statements are True or False:

(A) The sum of three odd numbers is even.

(B) The sum of two odd numbers and one even number is even.

(C) The product of three odd numbers is odd.

(D) If an even number is divided by 2, the quotient is always odd.

(E) All prime numbers are odd.

(F) Prime numbers do not have any factors.

(G) Sum of two prime numbers is always even.

(H) 2 is the only even prime number.

(I) All even numbers are composite numbers.

(J) The product of two even numbers is always even.

Solution:

(A) False

For example, 1+3+5=9, which is an odd number.

(B) True

For example, 1+3+4=8, which is an even number.

(C) True

For example, $1 \times 3 \times 5 = 15$, which is an odd number.

(D) False

For example, $\frac{10}{2} = 5, \frac{12}{2} = 6$

We can see that, both even and odd number appears as quotient.

(E) False

For example, 2 is an even prime number.

(F) False

Prime numbers have 1 and number itself as factors.

(G) False

Sum of two prime numbers can be even or odd both.

For example, 2+5=7, 5+7=12

(H) True

The only even prime number is 2.

(I) False

Composite numbers have at least three factors whereas prime numbers have only two factors, 1 and the number itself.

(J) True

The product of two even numbers is always even because it has 2 as a common factor.

3. The numbers 13 and 31 are prime numbers. Both these numbers have same digits 1 and **3**. Find such pairs of prime numbers up to 100.

Solution:

Given, prime numbers like 13 and 31

So,

17 and 71;

37 and 73;

79 and 97 are three pairs.

4. Write down separately the prime and composite numbers less than 20.

Solution:

Prime numbers are those numbers which have only two factor 1 and the number itself.

Prime numbers: 2, 3, 5, 7, 11, 13, 17, 19

Composite numbers are those numbers which have at least three factors.

Composite numbers: $4, 6, 8, 9, 10, 12, 14, 15, 16, 18$

5. What is the greatest prime number between 1 and 10?

Solution:

The greatest prime number between 1 and 10 is '7'.

6. Express the following as the sum of two odd primes.

(A) 44

(B) 36

(C) 24

(D) 18

Solution:

(A) $44 = 3 + 41$

(B) $36 = 31 + 5$

(C) $24 = 19 + 5$

(D) $18 = 13 + 5$

7. Give three pairs of prime numbers whose difference is 2.

[Remark: Two prime numbers whose difference is 2 are called twin primes].

Solution:

Following are the three pairs of twin primes: -

3 and 5;

5 and 7;

11 and 13

8. Which of the following numbers are prime?

(A) 23

(B) 51

(C) 37

(D) 26

Solution:

(A) 23 and (C) 37 are prime numbers.

9. Write seven consecutive composite numbers less than 100 so that there is no prime number between them.

Solution:

Seven consecutive composite numbers: $90, 91, 92, 93, 94, 95, 96$

10. Express each of the following numbers as the sum of three odd primes:

(A) 21

(B) 31

(C) 53

(D) 61

Solution:

(A) $21 = 3 + 7 + 11$

(B) $31 = 3 + 11 + 17$

(C) $53 = 13 + 17 + 23$

(D) $61 = 19 + 29 + 13$

11. Write five pairs of prime numbers less than 20 whose sum is divisible by 5.(Hint: $3 + 7 = 10$)

Solution:

$2 + 3 = 5;$

$7 + 13 = 20;$

$3 + 17 = 20;$

$2 + 13 = 15;$

$5 + 5 = 10$

12. Fill in the blanks:

(A) A number which has only two factors is called a ______.

(B) A number which has more than two factors is called a ______.

(C) 1 is neither ______ nor ______.

(D) The smallest prime number is ______.

(E) The smallest composite number is _____.

Solution:

(A) Prime number

Prime number has only two factors 1 and the number itself.

(B) Composite number

Composite number has more than two factors.

(C) Prime number and composite number

(D) The smallest prime number is 2.

(E) Composite numbers have more than two factors. The smallest composite number is 4.

Exercise 3.3

1. Using divisibility test, determine which of the following numbers are divisible by 2; by 3; by 4; by 5; by 6; by 8; by 9; by 10; by 11 (say, yes or no):

Number	**Divisible by**								
	2	3	4	5	6	8	9	10	11
128	Yes	No	Yes	No	No	Yes	No	No	No
990									
1586									
275									
6686									
639210									
429714									
2856									
3060									
406839									

Solution:

Number	**Divisible by**								
	2	3	4	5	6	8	9	10	11
128	Yes	No	Yes	No	No	Yes	No	No	No
990									
1586									
275									
6686									
639210									

429714 2856 3060 406839									

2. Using divisibility tests, determine which of the following numbers are divisible by 4 and by 8:

(A) 572

(B) 726352

(C) 5500

(D) 6000

(E) 12159

(F) 14560

(G) 21084

(H) 31795072

(I) 1700

(J) 2150

Solution:

(A)	572	→	Divisible by 4 as its last two digits are divisible by 4.
		→	Not divisible by 8 as its last three digits are not divisible by 8.
(B)	726352	→	Divisible by 4 as its last two digits are divisible by 4.
		→	Divisible by 8 as its last three digits are divisible by 8.
(C)	5500	→	Divisible by 4 as its last two digits are divisible by 4.
		→	Not divisible by 8 as its last three digits are not divisible by 8.
(D)	6000	→	Divisible by 4 as its last two digits are 0.
		→	Divisible by 8 as its last three digits are 0.
(E)	12159	→	Not divisible by 4 and 8 as it is an odd number.
(F)	14560	→	Divisible by 4 as its last two digits are 4.
		→	Divisible by 8 as its last three digits are 8.
(G)	21084	→	Divisible by 4 as its last two digits are 4.
		→	Not divisible by 8 as its last three digits are not divisible by 8.

(H)	31795072	→	Divisible by 4 as its last two digits are divisible by 4.
		→	Divisible by 8 as its last three digits are divisible by 8.
(I)	1700	→	Divisible by 4 as its last two digits are 0.
		→	Not divisible by 8 as its last three digits are not divisible by 8.
(J)	5500	→	Not divisible by 4 as its last two digits are not divisible by 4.
		→	Not divisible by 8 as its last three digits are not divisible by 8.

3. Using divisibility tests, determine which of following numbers are divisible by 6:

(A) 297144

(B) 1258

(C) 4335

(D) 61233

(E) 901352

(F) 438750

(G) 1790184

(H) 12583

(I) 639210

(J) 17852

Solution:

4. Using divisibility tests, determine which of the following numbers are divisible by 11:

(A) 5445

(B) 10824

(C) 7138965

(D) 70169308

(E) 10000001

(F) 901153

Solution:

(A)	5445	→	Sum of the digits at odd places $= 4 + 5 = 9$
		→	Sum of the digits at even places $= 4 + 5 = 9$

		→	Difference of both sums = 9 − 9 = 0
Since the difference is 0, therefore, the number is divisible by 11.			
(B)	10824	→	Sum of the digits at odd places = 4 + 8 + 1 = 13
		→	Sum of the digits at even places = 2 + 0 = 2
		→	Difference of both sums = 13 − 2 = 11
Since the difference is 11, therefore, the number is divisible by 11.			
(C)	7138965	→	Sum of the digits at odd places = 5 + 9 + 3 + 7 = 24
		→	Sum of the digits at even places = 6 + 8 + 1 = 15
		→	Difference of both sums = 24 − 15 = 9
Since the difference is neither 0 nor 11, therefore, the number is not divisible by 11.			
(D)	70169308	→	Sum of the digits at odd places = 8 + 3 + 6 + 0 = 17
		→	Sum of the digits at even places = 0 + 9 + 1 + 7 = 17
		→	Difference of both sums = 17 − 17 = 0
Since the difference is 0, therefore, the number is divisible by 11.			
(E)	10000001	→	Sum of the digits at odd places = 1 + 0 + 0 + 0 = 1
		→	Sum of the digits at even places = 0 + 0 + 0 + 1 = 1
		→	Difference of both sums = 1 − 1 = 0
Since the difference is 0, therefore, the number is divisible by 11.			
(F)	901153	→	Sum of the digits at odd places = 3 + 1 + 0 = 4
		→	Sum of the digits at even places = 5 + 1 + 9 = 15
		→	Difference of both sums = 15 − 4 = 11
Since the difference is 11, therefore, the number is divisible by 11.			

(A)	297144	→	Divisible by 2 as its units place is an even number.
		→	Divisible by 3 as sum of its digits (=27) is divisible by 3.
Since the number is divisible by both 2 and 3, therefore, it is also divisible by 6.			
(B)	1258	→	Divisible by 2 as its units place is an even number.
		→	Not divisible by 3 as sum of its digits (=16) is not divisible by 3.
Since the number is not divisible by both 2 and 3, therefore, it is not divisible by 6.			

(C)	4335	→	Not divisible by 2 as its units place is not an even number.
		→	Divisible by 3 as sum of its digits (=15) is divisible by 3.
Since the number is not divisible by both 2 and 3, therefore, it is not divisible by 6.			
(D)	61233	→	Not divisible by 2 as its units place is not an even number.
		→	Divisible by 3 as sum of its digits (=15) is divisible by 3.
Since the number is not divisible by both 2 and 3, therefore, it is also divisible by 6.			
(E)	901352	→	Divisible by 2 as its units place is an even number.
		→	Not divisible by 3 as sum of its digits (=20) is not divisible by 3.
Since the number is not divisible by both 2 and 3, therefore, it is not divisible by 6.			
(F)	438750	→	Divisible by 2 as its units place is an even number.
		→	Divisible by 3 as sum of its digits (=27) is not divisible by 3.
Since the number is divisible by both 2 and 3, therefore, it is divisible by 6.			
(G)	1790184	→	Divisible by 2 as its units place is an even number.
		→	Divisible by 3 as sum of its digits (=30) is not divisible by 3.
Since the number is divisible by both 2 and 3, therefore, it is divisible by 6.			
(H)	12583	→	Not divisible by 2 as its units place is not an even number.
		→	Not divisible by 3 as sum of its digits (=19) is not divisible by 3.
Since the number is not divisible by both 2 and 3, therefore, it is not divisible by 6.			
(I)	639210	→	Divisible by 2 as its units place is an even number.
		→	Divisible by 3 as sum of its digits (=21) is not divisible by 3.
Since the number is divisible by both 2 and 3, therefore, it is divisible by 6.			
(J)	17852	→	Divisible by 2 as its units place is an even number.
		→	Not divisible by 3 as sum of its digits (=23) is not divisible by 3.
Since the number is not divisible by both 2 and 3, therefore, it is not divisible by 6.			

5. Write the smallest digit and the greatest digit in the blank space of each of the following numbers so that the number formed is divisible by 3:

(A) 6724

(B) 4765__2

Solution:

(A) We know that a number is divisible by 3 if the sum of all digits is divisible by 3.			
Therefore,	Smallest digit: 2	→	26724 = 2 + 6 + 7 + 2 + 4 = 21
	Largest digit: 8	→	86724 = 8 + 6 + 7 + 2 + 4 = 27
(B) We know that a number is divisible by 3 if the sum of all digits is divisible by 3.			
Therefore,	Smallest digit: 0	→	476502 = 4 + 7 + 6 + 5 + 0 + 2 = 24
	Largest digit: 9	→	476592 = 4 + 7 + 6 + 5 + 0 + 2 = 33

6. Write the smallest digit and the largest digit in the blanks space of each of the following numbers so that the number formed is divisible by 11:

(A) 92 _ 389

(B) 8 _ 9484

Solution:

(A) We know that a number is divisible by 11 if the difference of the sum of the digits at odd places and that of even places should be either 0 or 11.			
Therefore,	928389	→	Odd places = 9 + 8 + 8 = 25 Even places = 2 + 3 + 9 = 14
			Difference = 25 − 14 = 11
(B) We know that a number is divisible by 11 if the difference of the sum of the digits at odd places and that of even places should be either 0 or 11.			
Therefore,	869484	→	Odd places = 8 + 9 + 8 = 25 Even places = 6 + 4 + 4 = 14
			Difference = 25 − 14 = 11

Exercise 3.4

1. Find the common factors of:

(A) 20 and 28

(B) 15 and 25

(C) 35 and 50

(D) 56 and 120

Solution:

(A) Factors of 20 = 1,2,4,5,10,20

Factors of 28 = 1,2,4,7,14,28

Common factors = 1,2,4

(B) Factors of 15 = 1,3,5,15

Factors of 25 = 1,5,25

Common factors = 1,5

(C) Factors of 35 = 1,5,7,35

Factors of 50 = 1,2,5,10,25,50

Common factors = 1,5

(D) Factors of 56 = 1,2,4,7,8,14,28,56

Factors of 120 = 1,2,3,4,5,6,8,10,12,15,20,24,30,40,60,120

Common factors = 1,2,4,8

2. Find the common factors of:

(A) 4, 8 and 12

(B) 5, 15 and 25

Solution:

(A) 4,8,12

Factors of 4 = 1,2,4

Factors of 8 = 1,2,4,8

Factors of 12 = 1,2,3,4,6,12

Common factors = 1,2,4

(B) 5,15, and 25

Factors of 5 = 1,5

Factors of 15 = 1,3,5,15

Factors of 25 = 1,5,25

Common factors = 1,5

3. Find first three common multiples of:

(A) 6 and 8

(B) 12 and 18

Solution:

(A) 6 and 8

Multiple of 6 = 6,12,18,24,30

Multiple of 8 = 8,16,24,32

3 common multiples = 24,48,72

(B) 12 and 18

Multiples of 12 = 12,24,36,78

Multiples of 18 = 18,36,54,72

3 common multiples = 36,72,108

4. Write all the numbers less than 100 which are common multiples of 3 and 4.

Solution:

Multiples of 3 = 3,6,9,12,15 ...

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

Common multiples = 12,24,36,48,60,72,84,96

5. Which of the following numbers are co-prime?

(A) 18 and 35

(B) 15 and 37

(C) 30 and 415

(D) 17 and 68

(E) 216 and 215

(F) 81 and 16

Solution:

(A) Factors of 18 = 1,2,3,6,9,18

Factors of 35 = 1,5,7,35

Common factor = 1

Therefore, the given two numbers are co-prime

(B) Factors of 15 = 1,3,5,15

Factors of 37 = 1,37

Common factors $= 1$

Therefore, the given two numbers are co-prime.

(C) Factors of $30 = 1,2,3,5,6,10,15,30$

Factors of $415 = 1,5,83,415$

Common factors $= 1,5$

As these numbers have a common factor other than 1, the given two numbers are not co-prime.

(D) Factors of $17 = 1,17$

Factors of $68 = 1,2,4,17,34,68$

Common factors $= 1,17$

As these numbers have a common factor other than 1, the given two numbers are not co-prime.

(E) Factors of $216 = 1,2,3,4,6,8,9,12,18,24,27,36,54,72,108,216$

Factors of $215 = 1,5,43,215$

Common factors $= 1$

Therefore, the given two numbers are co-prime.

(F) Factors of $81 = 1,3,9,27,81$

Factors of $16 = 1,2,4,8,16$

Common factors $= 1$

Therefore, the given two numbers are co-prime

6. A number is divisible by both 5 and 12 By which other number will that number be always divisible?

Solution:

Factors of $5 = 1,5$

Factors of $12 = 1,2,3,4,6,12$

As the common factor of these numbers is 1, the given two numbers are co- prime and the number will also be divisible by their product, i.e. 60, and the factors of 60, i.e., $1,2,3,4,5,6,10,12,15,20,30,6\mathbf{0}$.

7. A number is divisible by 12 By what other numbers will that number be divisible?

Ans: Since the number is divisible by 12, it will also be divisible by its factors i.e., $1,2,3,4,6,12$.Clearly, $1,2,3,4,$ and 6 are numbers other than 12 by which this number is also divisible.

Exercise 3.5

1. Which of the following statements are true?

(A) If a number is divisible by 3, it must be divisible by 9.

(B) If a number is divisible by 9, it must be divisible by 3.

(C) If a number is divisible by 18, it must be divisible by both 3 and 6.

(D) If a number is divisible by 9 and 10 both, then it must be divisible by 90.

(E) If two numbers are co-primes, at least one of them must be prime.

(F) All numbers which are divisible by 4 must also be divisible by 8.

(G) All numbers which are divisible by 8 must also be divisible by 4.

(H) If a number is exactly divides two numbers separately, it must exactly divide their sum.

(I) If a number exactly divides the sum of two numbers, it must exactly divide the two numbers separately.

Solution:

Statements (B), (C), (D), (G) and (H) are true.

(A) A number is divisible by 3 if the sum of digits is divisible by 3 but a number is divisible by 9 if the sum of digits is divisible by 9.

(B) If a number is divisible by 9, it must be divisible by 3 because 9 has 3 as a factor.

(C) If a number is divisible by 18, it must be divisible by both 3 and 6, because 18 has 3,6 as factors.

(D) If a number is divisible by 9 and 10 both, then it must be divisible by 90.

(E) A set of integers can also be called coprime, if its elements share no common positive factor except **1.** So, it is not necessary that at least one of them must be prime.

(F) Divisibility criteria of 4 is that last two digits should be divisible by 4 whereas divisibility criteria of 8 is that last three digit must be divisible by 8.

(G) All numbers which are divisible by 8 must also be divisible by 4, because 8 has 4 as a factor.

(H) If a number is exactly divides two numbers separately, it must exactly divide their sum.

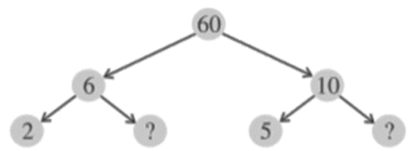
We can take common from their sum.

(I) If a number is exactly divides two numbers separately, it must exactly divide their sum.

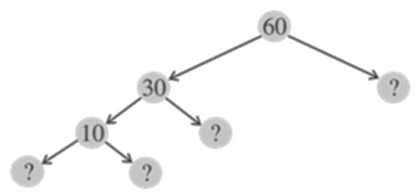
We can take common from their sum. But converse is not true.

2. Here are two different factor trees for 60.Write the missing numbers.

(A)

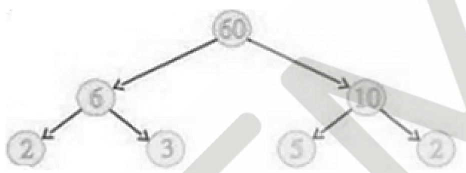


(B)



Solution:

(A)



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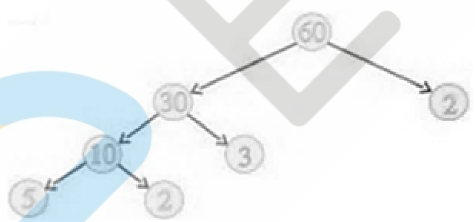


3. Which factors are not included in the prime factorization of a composite number?

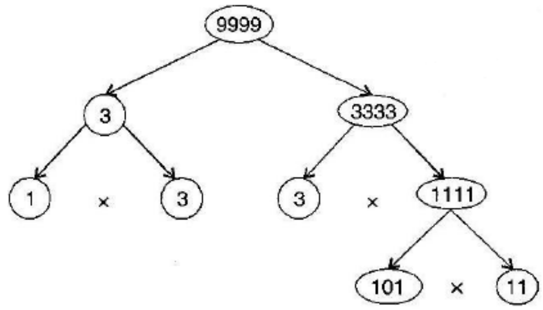
Solution:

1 is the factor which is not included in the prime factorization of a composite number.

4. Write the greatest 4-digit number and express it in terms of its prime factors.

Solution:

The greatest 4-digit number = 9999

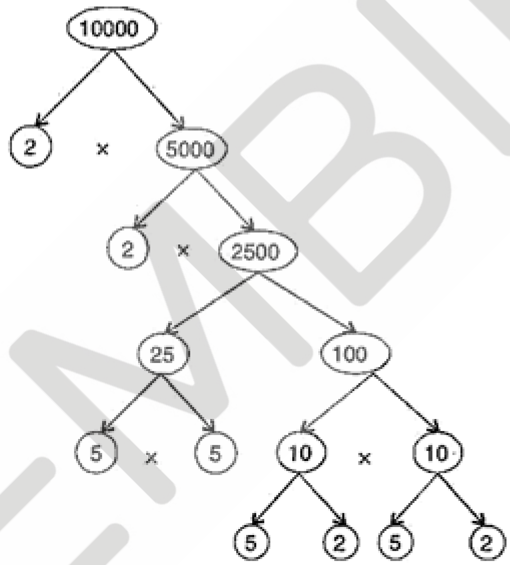


The prime factors of 9999 are $3 \times 3 \times 11 \times 101$.

5. Write the smallest 5-digit number and express it in terms of its prime factors.

Solution:

The smallest five-digit number is 10000.



The prime factors of 10000 are $2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5$.

6. Find all the prime factors of 1729 and arrange them in ascending order. Now state the relation, if any, between two consecutive prime factors.

Solution:

Prime factors of 1729 are $7 \times 13 \times 19$.

The difference of two consecutive prime factors is 6.

7. The product of three consecutive numbers is always divisible by **6**.Verify this statement with the help of some examples.

Solution:

Among the three consecutive numbers, there must be one even number and one multiple of **3**.Thus, the product must be multiple of 6.

Example:

(i) $2 \times 3 \times 4 = 24$

(ii) $4 \times 5 \times 6 = 120$

8. The sum of two consecutive odd numbers is always divisible by **4**.Verify this statement with the help of some examples.

Solution:

$3 + 5 = 8$ and 8 is divisible by 4.

$5 + 7 = 12$ and 12 is divisible by 4

$7 + 9 = 16$ and 16 is divisible by 4

$9 + 11 = 20$ and 20 is divisible by 4.

9. In which of the following expressions, prime factorization has been done?

(A) $24 = 2 \times 3 \times 4$

(B) $56 = 7 \times 2 \times 2 \times 2$

(C) $70 = 2 \times 5 \times 7$

(D) $54 = 2 \times 3 \times 9$

Solution:

In expressions (b) and (c), prime factorization has been done.

(A) $24 = 2 \times 3 \times 4 = 2 \times 2 \times 2 \times 3$

(B) $56 = 7 \times 2 \times 2 \times 2$

(C) $70 = 2 \times 5 \times 7$

(D) $54 = 2 \times 3 \times 9 = 2 \times 3 \times 3 \times 3$

10. Determine if 25110 is divisible by 45.

[Hint: 5 and 9 are co-prime numbers. Test the divisibility of the number by 5 and 9].

Solution:

The prime factorization of $45 = 5 \times 9$

25110 is divisible by 5 as ‘0’ is at its unit place

25110 is divisible by 9 as sum of digits is divisible by 9

Therefore, the number must be divisible by $5 \times 9 = 45$

11. 18 is divisible by both 2 and **3.** It is also divisible by $2 \times 3 = $ **6.** Similarly, a number is divisible by both 4 and **6.** Can we say that the number must also be divisible by $4 \times 6 = 24$? If not, give an example to justify your answer.

Solution:

No. Number 12 is divisible by both 6 and 4 but 12 is not divisible by 24.

12. I am the smallest number, having four different prime factors. Can you find me?

Solution:

The smallest four prime numbers are $2, 3, 5$ and 7.

Hence, the required number is $2 \times 3 \times 5 \times 7 = 210$

Exercise 3.6

1. Find the HCF of the following numbers:

(A) $18, 48$

(B) $30, 42$

(C) $18, 60$

(D) $27, 63$

(E) $36, 84$

(F) $34, 102$

(G) $70, 105, 175$

(H) $91, 112, 49$

(I) $18, 54, 81$

(J) $12, 45, 75$

Solution:

(A) Factors of $18 = 2 \times 3 \times 3$

Factors of $48 = 2 \times 2 \times 2 \times 2 \times 3$

H.C.F. $(18, 48) = 2 \times 3 = 6$

(B) Factors of $30 = 2 \times 3 \times 5$

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

H.C.F. $(30, 42) = 2 \times 3 = 6$

(C) Factors of $18 = 2 \times 3 \times 3$

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

H.C.F. $(18, 60) = 2 \times 3 = 6$

(D) Factors of $27 = 3 \times 3 \times 3$

Factors of $63 = 3 \times 3 \times 7$

H.C.F. $(27, 63) = 3 \times 3 = 9$

(E) Factors of $36 = 2 \times 2 \times 3 \times 3$

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

H.C.F. $(36, 84) = 2 \times 2 \times 3 = 12$

(F) Factors of $34 = 2 \times 17$

Factors of $102 = 2 \times 3 \times 17$

H.C.F. $(34, 102) = 2 \times 17 = 34$

(G) Factors of $70 = 2 \times 5 \times 7$

Factors of $105 = 3 \times 5 \times 7$

Factors of $175 = 5 \times 5 \times 7$

H.C.F. $= 5 \times 7 = 35$

(H) Factors of $91 = 7 \times 13$

Factors of $112 = 2 \times 2 \times 2 \times 2 \times 7$

Factors of $49 = 7 \times 7$

H.C.F. $= 1 \times 7 = 7$

(I) Factors of $18 = 2 \times 3 \times 3$

Factors of $54 = 2 \times 3 \times 3 \times 3$

Factors of $81 = 3 \times 3 \times 3 \times 3$

H.C.F. $= 3 \times 3 = 9$

(J) Factors of $12 = 2 \times 2 \times 3$

Factors of $45 = 3 \times 3 \times 5$

Factors of $75 = 3 \times 5 \times 5$

H.C.F $= 1 \times 3 = 3$

2. What is the HCF of two consecutive?

(A) numbers?

(B) even numbers?

(C) odd numbers?

Solution:

(A) H.C.F. of two consecutive numbers be 1.

(B) H.C.F. of two consecutive even numbers be 2.

(C) H.C.F. of two consecutive odd numbers be 1.

3. H.C.F. of co-prime numbers 4 and 15 was found as follows by factorisation:

$4 = 2 \times 2$ and $15 = 3 \times 5$ since there is no common prime factor, so HCF of 4 and 15 is 0.Is the answer correct? If not, what is the correct H.C.F.?

Solution:

No.

Factors of $4 = 2 \times 2 \times 1$

Factors of $15 = 3 \times 5 \times 1$

$\text{H.C.F} = 1$

So, the correct H.C.F. is 1.

3.7

1. Renu purchases two bags of fertilizer of weights 75 kg and 69 kg. Find the maximum value of weight which can measure the weight of the fertiliser exact number of times.

Solution:

For finding maximum weight, we have to find H.C.F. of 75 and 69.

Factors of $75 = 3 \times 5 \times 5$

Factors of $69 = 3 \times 69$

$\text{H.C.F.} = 3$

Therefore, the required weight is 3 kg.

2. Three boys step off together from the same spot. Their steps measure 63 cm, 70 cm and 77 cm respectively. What is the minimum distance each should cover so that all can cover the distance in complete steps?

Solution:

For finding minimum distance, we must find L.C.M. of 63, 70 and 77.

7	63, 70, 77

9	$9, 10, 11$
10	$1, 10, 11$
11	$1, 1, 11$
	$1, 1, 1$

L.C.M. of $63, 70$ and $77 = 7 \times 9 \times 10 \times 11 = 6930$ cm

Therefore, the minimum distance is 6930 cm.

3. The length, breadth and height of a room are 825 cm, 675 cm and 450 cm respectively. Find the longest tape which can measure the three dimensions of the room exactly.

Solution:

The measurement of longest tape $=$ H.C.F. of 825 cm, 675 cm and 450 cm.

Factors of $825 = 3 \times 5 \times 5 \times 11$

Factors of $675 = 3 \times 5 \times 5 \times 3 \times 3$

Factors of $450 = 2 \times 3 \times 3 \times 5 \times 5$

H.C.F.$= 3 \times 5 \times 5 = 75$ cm

Therefore, the longest tape is 75 cm.

4. Determine the smallest 3-digit number which is exactly divisible by $6, 8$ and 12.

Solution:

2	$6, 8, 12$
2	$3, 4, 6$
2	$3, 2, 3$
3	$3, 1, 3$
	$1, 1, 1$

L.C.M. of $6, 8$ and $12 = 2 \times 2 \times 2 \times 3 = 24$

The smallest 3-digit number $= 100$

To find the number, we must divide 100 by 24

$100 = 24 \times 4 + 4$

Therefore, the required number $= 100 + (24 - 4) = 120$.

5. Determine the largest 3-digit number which is exactly divisible by $8, 10$ and 12.

Solution:

2	8,10,12
2	$4, 5, 6$
2	$2, 5, 3$
3	$1, 5, 3$
5	$1, 5, 1$
	$1, 1, 1$

L.C.M. of $8, 10, 12 = 2 \times 2 \times 2 \times 3 \times 5 = 120$

The largest three-digit number $= 999$

Now,

$$\begin{array}{r|l} & 8 \\ 120 & 999 \\ & -960 \\ \hline & 39 \end{array}$$

Therefore, the required number $= 999 - 39 = 960$

6. The traffic lights at three different road crossings change after every 48 seconds, 72 seconds and 108 seconds respectively. If they change simultaneously at 7 a. m. at what time will they change simultaneously again?

Solution:

2	48,72,108
2	$24, 36, 54$
2	$12, 18, 27$
2	$6, 9, 27$
3	$3, 9, 27$
3	$1, 3, 9$
3	$1, 1, 3$
	$1, 1, 1$

L.C.M. of $48, 72, 108 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 432$ sec.

After 432 seconds, the lights change simultaneously.

432 second $= 7$ minutes 12 seconds

Therefore the time $= 7$ a. m. $+7$ minutes 12 seconds

$= 7:07:12$ a. m.

7. Three tankers contain 403 litres and 465 litres of diesel respectively. Find the maximum capacity of a container that can measure the diesel of three containers exact number of times.

Solution:

The maximum capacity of container $=$ H.C.F. $(403, 434, 465)$

Factors of $403 = 13 \times 31$

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

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

H.C.F. $= 31$

Therefore, 31 litres of container is required to measure the quantity.

8. Find the least number which when divided by $6, 15$ and 18, leave remainder 5 in each case.

Solution:

2	6,15,18
3	3, 15, 9
3	1, 5, 3
5	1, 5, 1
	1, 1, 1

L.C.M. of $6, 15$ and $18 = 2 \times 3 \times 3 \times 5 = 90$

Therefore, the required number $= 90 + 5 = 95$

9. Find the smallest 4-digit number which is divisible by $18, 24$ and 32.

Solution:

2	18,24,32
2	9, 12, 16
2	9, 6, 8
2	9, 3, 4
2	9, 3, 2
3	9, 3, 1
3	3, 1, 1
	1, 1, 1

L.C.M. of $18, 24$ and $32 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 288$

The smallest four-digit number $= 1000$

$$\begin{array}{r|l} 288 & \overline{1000}^{\;3} \\ & -864 \\ \hline & 136 \end{array}$$

Now,

Therefore, the required number is $1000 + (288 - 136) = 1152$.

10. Find the LCM of the following numbers:

(A) 9 and 4

(B) 12 and 5

(C) 6 and 5

(D) 15 and 4

Observe a common property in the obtained L.C.Ms. Is LCM the product of two numbers in each case?

Solution:

(A) L.C.M. of 9 and 4

2	9,4
2	9, 2
3	9, 1
3	3, 1
	1, 1

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

$= 36$

(B) L.C.M. of 12 and 5

2	12,5
2	6, 5
3	3, 5
5	1, 5
	1, 1

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

$= 60$

(C) L.C.M. of 6 and 5

2	6,5
3	3, 5
5	1, 5
	1, 1

$= 2 \times 3 \times 5$

$= 30$

(D) L.C.M. of 15 and 4

2	15,4
2	15, 2
3	15, 1
5	5, 1
	1, 1

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

$= 60$

Yes, the L.C.M. is equal to the product of two numbers in each case. And L.C.M. is also the multiple of 3.

11. Find the LCM of the following numbers in which one number is the factor of the other.

(A) $5, 20$

(B) $6, 18$

(C) $12, 48$

(D) $9, 45$

What do you observe in the results obtained?

Solution:

(A)

2	5,20
2	5, 10
5	5, 5
	1, 1

L.C.M. of 5 and 20

$= 2 \times 2 \times 5$

$= 20$

(B)

2	6,18
3	3, 9
3	1, 3
	1, 1

L.C.M. of 6 and 18

$= 2 \times 3 \times 3$

$= 18$

(C)

2	12,48
2	6, 24
2	3, 12
2	3, 6
3	3, 3
	1, 1

L.C.M. of 12 and 48

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

$= 48$

(D)

3	9,45
3	3, 15
5	1, 5
	1, 1

L.C.M. of 9 and 45

$= 3 \times 3 \times 5$

$= 45$

From these all cases, we can conclude that if the smallest number if the factor of largest number, then the L.C.M. of these two numbers is the larger number.