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ARITHMETIC TEST

CHAPTER

01

NUMBER AND NUMERIC SYSTEM

Number

In Hindu Arabic system, there are ten digits (i.e. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9). A number is formed by considering these digit as a group, which is called as numeral.

Systems

A numeric system is a set of characters and mathematical rules that are used to represent a number.

1. Indian system, **2.** International system

Indian/Hindu Arabic System

Periods	Crores		Lakhs		Thousands		Ones		
Values	Ten Crore 10,00,00,000	Crore 1,00,00,000	Ten Lakh 10,00,000	Lakh 1,00,000	Ten Thousand 10,000	Thousand 1,000	Hundred 100	Ten 10	One 1
Numeral	4	3	2	5	2	3	7	1	6

According to the Indian system, the above numeral is written as 43, 25, 23, 716. It is read as forty three crore twenty five lakh twenty three thousand seven hundred sixteen.

International System

Periods	Millions			Thousands			Ones		
Values	Hundred Million 100,000,000	Ten Million 10,000,000	Million 1,000,000	Hundred Thousand 100,000	Ten Thousand 10,000	Thousand 1,000	Hundred 100	Ten 10	One 1
Numeral	4	3	2	5	2	3	7	1	6

It is most commonly used system in the world. In this system above numeral is written as
432, 523, 716. It is read as four hundred thirty two million five hundred twenty three thousand seven hundred sixteen.

Example **1.** Write the following in words
(i) 8275 (ii) 76901 (iii) 1234578

Sol. (i) 8275 = Eight thousand two hundred seventy five.
(ii) 76901 = Seventy six thousand nine hundred one.
(iii) 1234578 = Twelve lakh thirty four thousand five hundred seventy eight.

Example **2.** Write the following in figures
(i) Seventy thousand three hundred sixty four.
(ii) One lakh twenty five thousand four hundred twenty.
(iii) Five crore fifty lakh five thousand five hundred five.

Sol. (1) 70364 (2) 125420 (3) 55005505

Face Value

The face value of a digit in a numeral is equal to the digit number itself, irrespective of the place occupied.
e.g., In 364, face value of '6' is 6.

Place Value

The place value of a digit in a numeral depends on the place it occupies.
Place value of a digit = Face value of the digit × Value of the place occupied
e.g., In 3548 the place value of 5 is $5 \times 100 = 500$

Example **3.** Find the difference between face value and place value of 8 in 35829.
(1) 834
(2) 729
(3) 792
(4) None of the above

Sol. **(3)** In 35829
Face value = 8 and place value = $8 \times 100 = 800$
$\therefore$ Difference = $800 - 8 = 792$

Least and Greatest Numbers

We know that, 1 is the least one digit number and 9 is the greatest one digit number. For finding the least number of n digit, we write $(n-1)$ zeros in the right side of 1 and for greatest number of n digit, we write the number 9 n times.
e.g., Least 4 digit number = 1000
Greatest 4 digit number = 9999

Successor and Predecessor of a Number

Successor is the number just after the given number and predecessor is the number just before the given number. To get successor or predecessor of a number we add or subtract 1 from it.
e.g., Successor of 856979 is 856980 and predecessor is 856978.

Roman Numbers

The numbers which we use are called 'Arabic Numbers' but sometimes we use the another system for writing numbers called roman system.
Mostly, roman numbers are used to denote the class standard and position (Rank) of a candidate, in faces of clocks, in page numbering etc.
The letters used in roman numbers are
I = 1, V = 5, X = 10, L = 50, C = 100, D = 500, M = 1000

Roman Numerals Chart

Roman	Arabic	Roman	Arabic
I	1	XVII	17
II	2	XVIII	18
III	3	XIX	19
IV	4	XX	20
V	5	XXX	30
VI	6	XL	40
VII	7	L	50
VIII	8	XC	90
IX	9	C	100
X	10	D	500
XI	11	DI	501
XII	12	DL	550
XIII	13	CM	9000
XIV	14	MD	1500
XV	15	MM	2000
XVI	16		

Types of Numbers

There are following types of number

Natural Numbers

The counting numbers such as 1, 2, 3, 4, ... are called as natural numbers.
The set of natural numbers is denoted by N.

$$N = \{1, 2, 3, 4, \ldots\}$$

(i) 1 is the smallest natural number.

(ii) 0 is not a natural number.

Whole Numbers

All natural numbers together with 0 (zero) are called whole numbers.

The set of whole numbers is denoted by W.

$$W = \{0, 1, 2, 3, 4, \ldots\}$$

Here, 0 is the smallest whole number.

Integer Numbers

All natural numbers together with 0 and negative numbers are called integer numbers.

The set of integer numbers is denoted by I.

$$I = \{\ldots\ldots, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, \ldots\}$$

(i) $I^+ = 1, 2, 3, 4, \ldots$ are positive integers.

(ii) $I^- = -1, -2, -3, -4, \ldots$ are negative integers.

(iii) 0 (zero) is neither positive integer nor negative integer.

Even Numbers

The natural numbers which are divisible by 2 are called as even numbers. *e.g.*, 2, 4, 6, 8, 10, ...

Here, 2 is the smallest even number.

Odd Numbers

The natural numbers which are not divisible by 2 are called as odd numbers. *e.g.*, 1, 3, 5, 7, 9, ...

Here, 1 is the smallest odd number.

Rational Numbers

Numbers which can be written in the form $\frac{p}{q}(q \neq 0)$, where p and q are integers, are called rational numbers.

e.g., $\frac{5}{4}, \frac{1}{7}, \frac{3}{8}$.

Irrational Numbers

Numbers which cannot be written in the form $\frac{p}{q}(q \neq 0)$, where p and q are integers, are called irrational numbers. *e.g.*, $\sqrt{2}, \sqrt{5}$.

Prime Numbers

The natural numbers greater than 1 which are not divisible by any number except 1 and itself are called prime numbers. *e.g.*, 2, 3, 5, 7, ...

(i) 2 is the smallest prime number and again it is the only even prime number.

(ii) The prime numbers upto 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97.

(iii) The elements in the set of natural numbers, prime numbers and whole numbers are infinite.

Composite Numbers

Numbers other than 1 which are not prime are called composite numbers. As 4, 6, 8, 9 are all composite numbers.

(i) 4 is the smallest composite number.

(ii) 1 is neither prime nor composite.

Entrance Corner

1. Which of the following statement is correct? [JNV 2019]

(1) Zero is an odd number
(2) Zero is an even number
(3) Zero is a prime number
(4) Zero is neither odd nor even number

2. What is the sum of the place value of 5 in the number 584356? [JNV 2019]

(1) 10 (2) 50050 (3) 5050 (4) 500050

3. The difference between the greatest and the smallest 5-digit numbers, formed by the digits 0, 3, 6, 7 and 9 without repetition, is [JNV 2019]

(1) 93951 (2) 67061 (3) 66951 (4) 60840

4. Find the differences between 5 digits greater and 5 digits smaller number with different digits. [JNV 2018]

(1) 41976 (2) 88531 (3) 98531 (4) 108999

5. Using the different digits, find the smallest number of 4 digits in which 9 is in tens place. [JNV 2018]

(1) 1290 (2) 1092
(3) 2091 (4) 2190

6. Which is the smallest 5 digit number formed by digits 5,1,6 when two digits can be used twice? [JNV 2018]

(1) 11565 (2) 51156
(3) 11556 (4) 11655

7. In which of the following numbers only one prime number lie. [JNV 2018]
(1) 40 and 50 (2) 60 and 70
(3) 80 and 90 (4) 90 and 100

8. What is quotient when 76076 is divided by 13? [JNV 2018]
(1) 5652 (2) 5852 (3) 5762 (4) 5662

9. Which one is the smallest number? [JNV 2016]
(1) 7413 (2) 7130 (3) 7985 (4) 7545

10. The difference between the smallest number of six-digits and the largest number of four-digits is [JNV 2016]
(1) 90001 (2) 91000 (3) 90100 (4) 90010

11. Which one of the following is the correct statement for the numbers 56 and 84? [JNV 2016]
(1) Both the numbers are prime
(2) Both the numbers are co-prime
(3) Both the numbers are multiple of 14
(4) Both the numbers are odd

12. Five digits greatest number to be formed with the help of 7, 2, 4, 8 and 0 is (each digit using once time) [JNV 2015]
(1) 80742 (2) 87042 (3) 87420 (4) 87402

13. Which statement is true for 11 and 21? [JNV 2015]
(1) Both are divisible numbers
(2) Both are even numbers
(3) Both are co-prime numbers
(4) Both are multiple of 3

14. Five digits greatest odd number to be formed with the help of 3, 5, 7, 9 and 0 is [JNV 2014]
(1) 90573 (2) 97530 (3) 97503 (4) 97053

15. Highest two digits prime number is [JNV 2013]
(1) 93 (2) 97 (3) 91 (4) 99

16. Find the greatest five digit even number using the 3, 0, 5, 7 and 8 digits. [JNV 2013]
(1) 83570 (2) 85703 (3) 87530 (4) 87350

17. Find the greatest five digit number using the 9, 6, 3 and 0 digits (Any one digit repeated twice.) [JNV 2012]
(1) 96630 (2) 96300 (3) 99630 (4) 90963

18. The difference between the place values of two 7s in 27307 is [JNV 2011]
(1) 6993 (2) 7300 (3) 307 (4) 40

19. Which one of the following is a prime number? [JNV 2011]
(1) 81 (2) 83 (3) 85 (4) 87

20. Eighty thousand nine hundred and five is represented in number form as [JNV 2011]
(1) 8095 (2) 80905 (3) 809005 (4) 8009005

21. Sixteen lakh eight hundred and thirteen may be written in digit as [JNV 2010]
(1) 16813 (2) 160830 (3) 1600813 (4) 160813

22. The place value of 5 in 214.56 [JNV 2010]
(1) 5×1 (2) 5×10
(3) 5×0.1 (4) 5×0.01

23. Find a prime even number out of the following numbers. [JNV 2008]
(1) 4 (2) 6
(3) 2 (4) 13

24. In a question of division if divisor is 51, quotient 16 and remainder 27, then the dividend will be [JNV 2004, 1994]
(1) 843 (2) 483
(3) 94 (4) 1393

Answers

1. (4)	**2.** (4)	**3.** (3)	**4.** (2)	**5.** (2)	**6.** (3)	**7.** (4)	**8.** (2)	**9.** (2)	**10.** (1)
11. (3)	**12.** (3)	**13.** (3)	**14.** (3)	**15.** (2)	**16.** (3)	**17.** (3)	**18.** (1)	**19.** (2)	**20.** (2)
21. (3)	**22.** (3)	**23.** (3)	**24.** (1)						

Hints and Solutions

1. Zero is neither odd nor even number.

2. Given, 5 84 356

Place values of 5 → [5] 84 3 [5] 6

i.e. 500000 and 50

Sum of place values of 5 = 500000 + 50

= 500000

3. Given digits = 0, 3, 6, 7, 9

Greatest 5-digit number = 97630

Smallest 5-digit number = 30679

∴ The difference between the greatest and the smallest numbers = 97630 − 30679 = 66951

4. 5-digit largest number = 98765

5-digit smaller number = 10234

Required difference = 98765 − 10234 = 88531

5. The smallest number of four digits by using different digit = 1092

6. The 5-digit smallest number using digit 5, 1, 6 by using two digits twice = 11556

7. Between 90 and 100 only one prime number '97' exist.

8.
$$\begin{array}{r|l} 13\overline{)76076} & 5852 \text{ quotient} \\ \underline{65} & \\ 110 & \\ \underline{104} & \\ 67 & \\ \underline{65} & \\ 26 & \\ \underline{26} & \\ 0 \text{ Remainder.} & \end{array}$$

9. The smallest number is 7130.

10. Smallest number of 6-digits = 100000

Largest number of 4-digits = 9999

Then, the required difference = 100000 − 9999

= 90001

11. 56 = 14 × 4 and 84 = 14 × 6

It is clear from the above factors both numbers are multiple of 14.

12. Five digits greatest number to be formed with the help of 7, 2, 4, 8 and 0 digit = 87420

13. Both 11 and 21 are co-prime numbers.

14. Required odd number

Ten Th	Th	Hun	Ten	Unit
9	7	50	0	3

15. In the given number 97 is the two digits largest prime number.

16. Required largest five digits even number

= 87530

17. Required largest five digits (any one digit repeated twice) number = 99630

18. ∵ Place values of two 7s in 27307 are

= 7000 and 7

∴ Difference = (7000 − 7) = 6993

19. 83 is a prime number.

20. Eighty thousand nine hundred and five represented in number form as 80905

23. Prime number = 2, 3, 5, 7, 11, 13, 17 etc.

∴ Prime even number = 2

24. As we know,

Dividend = Divisor + Quotient + Remainder

Dividend = 51 × 16 + 27 = 816 + 27 = 843

Practice Exercise

1. 12 thousands + 13 hundreds + 2 tens is equal to

(1) 12132 (2) 13320

(3) 130132 (4) 121320

2. The difference between the greatest number of four digits and the smallest number of five digits is

(1) 1 (2) 11

(3) 1111 (4) 8999

3. The place value of 5 in 64532981 is

(1) five thousand (2) fifty thousand

(3) five lakh (4) fifty lakh

4. Ninety thousand and ninety nine may be written in digit as

(1) 90000909 (2) 9000099 (3) 90909 (4) 90099

5. The difference between the largest and the smallest numbers of three digits is

(1) 999 (2) 998 (3) 899 (4) 888

6. In number 36490, when the digits 6 and 9 are interchanged, then the difference between the original and the new number is
(1) 2870 (2) 2960 (3) 2970 (4) 3970

7. Find the sum of the face values of 9 and 6 in 907364.
(1) 15 (2) 20 (3) 9 (4) 18

8. Find the smallest number, which by adding or subtracting to or from an even number will be an odd number.
(1) 0 (2) 1 (3) 2 (4) 3

9. Using digits 1, 0, 5 and 7, the greatest 4 digit number formed is
(1) 1075 (2) 1057 (3) 5017 (4) 7510

10. The smallest 4-digits even number formed by the digits 0, 1, 2 and 3 is
(1) 1023 (2) 1032 (3) 3201 (4) 3210

11. The sum of the greatest and the smallest number of four digits is
(1) 8999 (2) 10999 (3) 11110 (4) 11111

12. Find the difference between largest and smallest 5 digit number, which are formed from digits 0, 2, 5, 6 and 8.
(1) 65925 (2) 69552 (3) 65952 (4) 65592

13. The smallest odd number formed by using the digits 1, 0, 3, 4 and 5 is
(1) 10345 (2) 10453 (3) 10543 (4) 10534

14. How many prime numbers are there between 80 and 100?
(1) 6 (2) 7 (3) 8 (4) 3

15. The number which when multiplied by 13 is increased by 180 is
(1) 15 (2) 5 (3) 12 (4) 25

16. The smallest number of four digits is
(1) 1001 (2) 0001 (3) 0010 (4) 1000

17. Sum of all prime numbers between 1 and 10 is
(1) 15 (2) 17 (3) 18 (4) 16

Answers

1. (2)	**2.** (1)	**3.** (3)	**4.** (4)	**5.** (3)	**6.** (3)	**7.** (1)	**8.** (2)	**9.** (4)	**10.** (2)
11. (2)	**12.** (3)	**13.** (1)	**14.** (4)	**15.** (1)	**16.** (4)	**17.** (2)			

Hints and Solutions

1. 12 thousands + 13 hundreds + 2 tens
$= 12000 + 1300 + 20 = 13320$

2. ∵ Smallest number of five digits = 10000
Greatest number of four digits = 9999
∴ Difference = (10000 − 9999) = 1

3. The place value of 5 in 64532981 is
= 500000 or 5 lakh

4. Ninety thousand and ninety nine = 90099

5. ∵ Difference = 999 − 100 = 899

6. ∵ Original number = 36490
New number = 39460
∴ Difference = (39460 − 36490) = 2970

7. The face value is the value of digit itself.
So, required sum = 9 + 6 = 15

8. 8 is an even number by adding or subtracting 1 to or from it, the result will be 9 and 7 respectively which are odd numbers.

9. 7510

10. 1032

11. Greatest number of four digit = 9999
Smallest number of four digit = 1000
Sum = 9999 + 1000 = 10999

12. Given, digits = 0, 2, 5, 6 and 8
Largest 5-digit number = 86520
Smallest 5-digit number = 20568
∴ Required difference = 86520 − 20568
= 65952

13. The required odd number formed is 10345.

14. 3 prime numbers are between 80 and 100.

15. $13 \times 15 - 15 = 180$

17. Prime number between 1 and 10
= 2 + 3 + 5 + 7 = 17

Self Practice

1. One lakh, thirty five thousand, four hundred and twenty six is written in figures as
(1) 133256 (2) 135426 (3) 153263 (4) 153353

2. The difference between the place value and face value of 4 in 45689, is
(1) 40000 (2) 39999 (3) 39996 (4) 39000

3. The predecessor of 8000 is
(1) 7999 (2) 8001 (3) 7989 (4) 7988

4. The greatest number of 5 digits which starts from 8 and ends with 7 is
(1) 89997 (2) 88997 (3) 88887 (4) 87987

5. The least number formed with the digit 0, 4, 2, 6 is
(1) 0462 (2) 4026 (3) 0246 (4) 2046

6. What is the greatest number that forms from the digits 3, 5, 0, 6?
(1) 6503 (2) 6530 (3) 6350 (4) 6053

7. How many numbers are of 4 digits?
(1) 9000 (2) 1000 (3) 900 (4) None of these

8. Find the least number formed by the digits 7, 0, 0 and 2.
(1) 7200 (2) 2007 (3) 2070 (4) 7020

9. In the given number 890436, if you write 0 in place of 4, by how much the resulting number be less than this given number?
(1) 40 (2) 400 (3) 436 (4) 36

10. The sum of all odd numbers less than 10 is
(1) 15 (2) 25 (3) 23 (4) 24

11. The sum of all prime numbers less than 15 is
(1) 39 (2) 42 (3) 41 (4) 45

12. How many prime numbers are there in between 1 and 10?
(1) 2 (2) 3 (3) 4 (4) 5

13. Which one of the following statements is true?
(1) All even numbers are composite numbers
(2) All odd numbers are prime numbers
(3) There are infinitely prime numbers
(4) A prime number can be written as the product of more than two natural numbers

14. The sum of 3 even numbers will be
(1) always even (2) always odd
(3) sometimes even and sometimes odd (4) None of these

15. What will remain after subtracting 11 ten times from 121?
(1) 0 (2) 11 (3) 22 (4) 10

Answers

1. (2)	**2.** (3)	**3.** (1)	**4.** (1)	**5.** (2)	**6.** (2)	**7.** (1)	**8.** (2)	**9.** (2)	**10.** (2)
11. (3)	**12.** (3)	**13.** (3)	**14.** (1)	**15.** (2)					

CHAPTER

02

FOUR FUNDAMENTAL OPERATIONS ON WHOLE NUMBERS

Whole Numbers

All natural numbers together with 0 (zero) are called whole numbers. Addition as well as multiplication of two whole numbers must be a whole number but same is not true while having the operation like subtraction and division on whole number.

Fundamental Operations

Closure Law

For addition	For multiplication
$1+2=3$	$2\times3=6$
$4+5=9$	$4\times5=20$

Commutative Law

For addition	For multiplication
$2+3=3+2$	$2\times3=3\times2$
$11+7=7+11$	$11\times7=7\times11$

Associative Law

For addition

$1+(2+3)=(1+2)+3$

$5+(9+11)=(5+9)+11$

For multiplation

$1\times(2\times3)=(1\times2)\times3$

$5\times(9\times11)=(5\times9)\times11$

Distributive Law

$2\times(4+5)=2\times4+2\times5$

$(11+7)\times5=11\times5+7\times5$

Identity Elements

Zero is the identity element for addition and 1 is the identity element for multiplication.

Properties of Zero

- When zero is added or subtracted from any number, the result is the number itself.
  e.g., $4+0=4, 18+0=18$
  $6-0=6, 24-0=24$
- Product of any whole number and zero is zero.
  e.g., $4\times0=0$
- If we divide zero by any whole number, the result is zero.
  e.g., $0\div10=0, 0\div4=0$
- If power of any number is zero, then the value of that number will be 1.
  e.g., $1^0=1, 4^0=1$

Properties of One

The product of any whole number and 1 is the whole number itself.

e.g., $18\times1=18, 5\times1=5$

Tests of Divisibility

Test of divisibility may be derived from the properties of multiples of specific divisors.

Divisibility by 2

Any number, having last digit is either 2, 4, 6, 8 or zero is divisible by 2.

e.g., 12, 86, 130, 242 and 306 are divisible by 2.

Divisibility by 3

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

e.g., 426

$4 + 2 + 6 = 12$ which is divisible by 3. Hence, 426 is divisible by 3.

Divisibility by 4

If the last two digits of a number are divisible by 4, the number is divisible by 4. The number having two or more zeros at the end is also divisible by 4.

e.g., 3<u>24</u>, 8<u>24</u>, 56<u>32</u>, 35<u>00</u>, 43<u>20</u>, are divisible by 4.

Divisibility by 5

If a number ends in 5 or 0, the number is divisible by 5.

e.g., 1345

As its last digit is 5, it is divisible by 5.

Divisibility by 6

A number is divisible by 6, when it is divisible by 2 as well as 3. This rule can be obtained from the fact that 2 and 3 are the two factors or submultiples of 6.

(i) The number should end with an even digit or 0.

(ii) The sum of its digits should be divisible by 3.

e.g., 4554

Here, as the number is even, so it is divisibly by 2.

Also, the sum of digits = $4 + 5 + 5 + 4 = 18$,

which is divisible by 3.

So, the number 4554 is divisible by 6.

Divisibility by 8

If the last three digits of a number is divisible by 8, the number is also divisible by 8. Also, if the last three digits of a number are zeros, the number is divisible by 8.

e.g., 3<u>648</u>

Since, 648 is divisible by 8, 3648 is divisible by 8.

Divisibility by 9

If the sum of all the digits, of a number is divisible by 9, the number is also divisible by 9.

e.g., 39681 : $3 + 9 + 6 + 8 + 1 = 27$ is divisible by 9, hence the number is also divisible by 9.

Divisibility by 10

Any number which ends with zero is divisible by 10.

e.g., The numbers 150, 540, 1860, 2210 etc. are divisible by 10.

Divisibility by 11

If the sums of digits at odd and even places are equal by a number divisible by 11, then the number is also divisible by 11.

e.g., 3245682 : Odd place value = $3 + 4 + 6 + 2 = 15$ and even place value = $2 + 5 + 8 = 15$

As, odd place value = even place value, the number is divisible by 11.

Important Facts

- If a number is made by writing a digit 6 times, then the number is divisible by 7, 11 and 13. *e.g.*, 888888 is divisible by 7, 11 and 13.
- If a number is made by writing a 2 digit number 3 times, then the number is divisible by 7 and 13. *e.g.*, 939393 is divisible by both 7 and 13.
- If a number is made by repeating a 3 digit number 2 times, then the number is divisible by 7, 11 and 13. *e.g.*, 973973 is divisible by 7, 11 and 13.

Example **1.** 85536 is divisible by which number, without actual division?

(1) 5 (2) 3
(3) 7 (4) 13

Sol. **(2)** Sum of the digits = $8 + 5 + 5 + 3 + 6 = 27$

As 27 is divisible by 3, so the given number 85536 is divisible by 3.

Other Important Formulae

- Dividend = Divisor × Quotient + Remainder
- $\text{Divisor} = \frac{\text{Dividend} - \text{Remainder}}{\text{Quotient}}$

Example **2.** On dividing 18270 by a certain number, the quotient is 186 and the remainder is 42. Find the divisor.

(1) 48 (2) 79
(3) 98 (4) 108

Sol. **(3)** $\text{Divisor} = \frac{\text{Dividend} - \text{Remainder}}{\text{Quotient}}$

$= \frac{18270 - 42}{186}$

$= \frac{18228}{186} = 98$

So, divisor is 98.

Example **3.** What least number should be added to the least number of four digits, so that the resulting number is exactly divisible by 89?

(1) 68 (2) 64
(3) 51 (4) 52

Sol. **(1)** Least number of four digits = 1000

89) 1000 (11
89
110
89
21

∴ Required number = 89 – 21 = 68

Unit Digit

Extreme right digit of a number is known as unit digit of that number.

Unit Digit in the Multiplication of Numbers

If we want to the unit digit in the multiplication of some numbers, we can do so by multiplying only the unit digits of the given numbers.

e.g., Unit digit in $786 \times 498 \times 189 \times 592$
= Unit digit in $6 \times 8 \times 9 \times 2$
= Unit digit in $864 = 4$

Entrance Corner

1. When –1 is multiplied by itself 100 times, the product is c
(1) 1 (2) –1 (3) 100 (4) –100

2. A store sells a packet of 5 apples in ₹25 and a single apple in ₹ 6, if a lady purchase 27 apples. How much money will she pay? [JNV 2018]
(1) ₹ 128 (2) ₹ 130
(3) ₹ 137 (4) ₹ 150

3. Kaku got 7 marks less than Bakshi while Raman got 3 marks more than Kaku. If the total marks obtained by all three is 76. Find the marks obtained by Raman. [JNV 2018]
(1) 22 (2) 25 (3) 29 (4) 31

4. Ram got 8 marks more than Shyam in an examination. Anil got 4 marks more than Ram in the same examination. If all three of them got 128 marks together as a total, Ram's marks would be [JNV 2016]
(1) 36 (2) 44 (3) 48 (4) 54

5. Rajesh's weight is 5 kg less than Ram's weight and Neha's weight is 3 kg more than Ram's weight. If the weight of three is 103 kg, then the weight of Ram is [JNV 2015]
(1) 34 kg (2) 38 kg (3) 33 kg (4) 35 kg

6. In an examination Karan got 10 marks more than Bhavna. Isha got 5 marks less than Bhavna. If Trio get a total of 170, then what is the marks obtained by Isha? [JNV 2014]
(1) 65 (2) 55 (3) 50 (4) 45

7. 1000000 is obtained, when a number is subtracted from the sum of 893645 and 635489, find that number. [JNV 2014]
(1)106355 (2) 364511
(3) 51329 (4) 529134

8. A shopkeeper charges ₹ 10 for every bottle of coke or ₹ 240 for every crate of 30 bottles. If Vandana wants to buy 185 bottle of coke, what amount she will have to pay? [JNV 2014]
(1) ₹ 1480 (2) ₹ 1490
(3) ₹ 1600 (4) ₹ 1850

9. What is the maximum difference between the smallest number formed by 7 numerals and the largest number formed by 6 numerals? [JNV 2014]
(1) 1 (2) 35802
(3) 38502 (4) 999998

10. Unit digit of product of first ten prime number is [JNV 2014]
(1) 6 (2) 4 (3) 2 (4) 0

11. The difference between the highest and lowest five digits number using 0, 3, 6, 8 and 9 digit (each digits using once time). [JNV 2013]
(1) 94941 (2) 61821 (3) 61740 (4) 67941

12. The sum of two numbers is 234560. If one number is more than other number by ten thousand ten. Find the greatest number. [JNV 2013]
(1) 112272 (2) 112275 (3) 132285 (4) 117280

13. Find out the unit's digit in the product of $(3207 \times 12 \times 17 \times 13)$. [JNV 2013]
(1) 0 (2) 3 (3) 4 (4) 7

14. Which of the following is the smallest four digits number? [JNV 2011]
(1) 1000 (2) 1100 (3) 1300 (4) 1900

15. The multiple of 7 between 14 and 77 is [JNV 2011]
(1) 10 (2) 9 (3) 8 (4) 7

16. What value must be given to *, so that the number 6912* is divisible by 25? [JNV 2011, 1997]
(1) 3 (2) 5 (3) 4 (4) 7

17. The value of $20.91 \div 0.17$ is [JNV 2011]
(1) 0.0123 (2) 1.230 (3) 12.30 (4) 123.0

18. 14 rows in a park 420 cars stand in every row. Then, how many cars will stand in the park? [JNV 2010]
(1) 5880 (2) 434 (3) 406 (4) 30

19. A number
- is less than 50 - multiple of 7
- have 3 factors
Then, the number is [JNV 2010]
(1) 14 (2) 42 (3) 49 (4) 70

20. What should be added to 65° to make it a right angle? [JNV 2008]
(1) 35° (2) 45° (3) 40° (4) 25°

21. In a well water level was 18 m below. Due to rains water level increased by 3.5 m. What is the water level in the well now? [JNV 2008]
(1) 14.5 m (2) 15.6 m (3) 21.5 m (4) 3.5 m

22. What is the greatest four digits number in which all the digits are different? [JNV 2007]
(1) 9876 (2) 9768 (3) 9867 (4) 9786

23. 2408 × 200 is equal to [JNV 2007]
(1) 480160 (2) 480016
(3) 481600 (4) 461600

24. The product of three numbers is 7980. In which the product of two numbers is 228, then what is the third number? [JNV 2007]
(1) 25 (2) 15 (3) 16 (4) 35

25. The sum of the greatest and the smallest 4 digit numbers is [JNV 2004]
(1) 8999 (2) 10999
(3) 11110 (4) 111111

26. The product of two numbers is 8192. One of the number is two times the second number, the smaller number is [JNV 2004]
(1) 8 (2) 16 (3) 32 (4) 64

27. The smallest odd number formed by the digits 1, 0, 3, 4 and 5 will be [JNV 2004]
(1) 10345 (2) 10453
(3) 10543 (4) 10534

28. The number 13013 is divisible by 13. The smallest 5 digit number beginning with 14 and exactly divisible by 13 is [JNV 2003, 1995]
(1) 14040 (2) 14001
(3) 14014 (4) 14027

29. In a question of division if divisor is 51, quotient 16 and remainder 27, then the dividend will be [JNV 2003, 1995]
(1) 843 (2) 483
(3) 9 (4) 1393

Answers

1. (2)	**2.** (3)	**3.** (2)	**4.** (2)	**5.** (4)	**6.** (3)	**7.** (4)	**8.** (2)	**9.** (1)	**10.** (4)
11. (4)	**12.** (2)	**13.** (3)	**14.** (1)	**15.** (3)	**16.** (2)	**17.** (4)	**18.** (1)	**19.** (2)	**20.** (4)
21. (1)	**22.** (1)	**23.** (3)	**24.** (4)	**25.** (2)	**26.** (4)	**27.** (1)	**28.** (2)	**29.** (1)	

Hints and Solutions

1. According to the question,
$\therefore$ Required answer $= (-1) \times (1)^{100} = (-1)^{101} = -1$

2. Price of packet of 5 apples is ₹ 25.
Price of a single apple = ₹ 6
Now, 27 apples = 5×5 packet + 2 apple
$= 5 \times 25 + 2 \times 6 = 125 + 12 =$ ₹ 137
$\therefore$ Price of 27 apples = ₹ 137

3. $\therefore$ Let marks obtained by Kaku = x
Marks obtained by Raman = $x + 3$
Marks obtained by Bakshi = $x + 7$
According to the question
$x + x + 3 + x + 7 = 76$

$3x + 10 = 76 \Rightarrow 3x = 66 = 22$

$\therefore$ Marks obtains by Raman $= x + 3 = 22 + 3 = 25$

4. Let the marks obtained by Shyam be x.
Then, marks obtained by Ram $= x + 8$
and marks obtained by Anil $= x + 8 + 4$
$= x + 12$
According to the question,
$x + x + 8 + x + 12 = 128$, $3x + 20 = 128$
$3x = 108$, $x = 36$
So, marks obtained by Ram $= x + 8 = 36 + 8 = 44$

5. Suppose Ram's weight $= x$ kg
Then, Rajesh's weight $= (x - 5)$ kg
and Neha's weight $= (x + 3)$ kg
Then, $x + (x - 5) + (x + 3) = 103$
$\Rightarrow \quad 3x - 2 = 103 \Rightarrow 3x = 105$
$\therefore \quad x = \frac{105}{3} = 35$ kg

6. Let the score of Bhavna be x, then
Score of Karan $= x + 10$
Score of Isha $= x - 5$
According to the question,
$x + 10 + x - 5 + x = 170$
$\Rightarrow \quad 3x + 5 = 170 \Rightarrow 3x = 165$
$\therefore \quad x = 55$
Obtained mark of Isha $= 55 - 5 = 50$

7. Sum $= 893645 + 635489 = 1529134$
Let the number which is to be subtracted is x,
then $1529134 - x = 1000000$
$\Rightarrow x = 1529134 - 1000000 = 529134$

8. Given, 1 crate $= 30$ bottles
185 bottles $= 6$ crate $+ 5$ bottles
$= 6 \times 240 + 5 \times 10 = 1440 + 50 = ₹ 1490$

9. Smallest number of seven digit $= 1000000$
Greatest number of six digit $= 999999$
Required difference $= 1000000 - 999999 = 1$

10. First ten prime numbers
2, 3, 5, 7, 11, 13, 17, 19, 23, 29
Product of first ten prime numbers
$2 \times 3 \times 5 \times 7 \times 11 \times 13 \times 17 \times 19 \times 23 \times 29$
$\therefore$ Unit digit of product of $2 \times 3 \times 5 = 0$
Hence, the unit digit of first ten prime number
$= 0$(0 multiplied by any number gives always 0).

11. Largest number of 5 digits $= 98630$
Samallest number of 5 digits $= 30689$
Hence, required difference
$= 98630 - 30689 = 67941$

12. Suppose, first number $= x$
and second number $= x + 10010$
Then, $x + x + 10010 = 234560$
$\Rightarrow \quad 2x = 234560 - 10010$
$\Rightarrow \quad 2x = 224550 \Rightarrow x = 112275$
Hence, greatest number $= x + 10010$
$= 112275 + 10010 = 122285$

13.
$$\underset{\uparrow}{3207} \times \underset{\uparrow}{12} \times \underset{\uparrow}{17} \times \underset{\uparrow}{13}$$
$$7 \quad 2 \quad 7 \quad 3$$
$\therefore$ Unit's digits are 7, 2, 7 and 3.
Hence, required product $= 7 \times 2 \times 7 \times 3 = 294$
$\therefore \quad$ Unit's digit $= 4$

14. Smallest four digits number $= 1000$

15. Multiples of 7 between 14 and 77
$= 21, 28, 35, 42, 49, 56, 63, 70$
So, total numbers of multiples are $= 8$

16. The numbers divisible by 25 are only the numbers with last digits 25, 50, 75 and 100. So, 5 is required number.

17. $\because 20.91 \div 0.17 = \frac{2091}{100} \times \frac{100}{17} = 123.0$

18. Requird number of cars $= 14 \times 420 = 5880$

19. Required number $= 42$
$\therefore$ Factors of $42 = 2 \times 3 \times 7$

20. Right angle is $90°$.
$\therefore \quad 90° - 65° = 25°$

21. Required level $= 18 - 3.5 = 14.5$ m

22. Arrange it in descending order starting from 9.
Hence, required number $= 9876$

23. $2408 \times 200 = 481600$

24. Third number $= \frac{7980}{228} = 35$

25. The greatest 4 digit number $= 9999$
The smallest 4 digit number $= 1000$
Total $= 10999$

26. Let the number be x and $2x$.
$\therefore \quad x \times 2x = 8192$
$x \times x = \frac{8192}{2} = 4096$
$\Rightarrow \quad x^2 = 4096$
$\Rightarrow \quad x = \sqrt{4096}$
$\Rightarrow \quad x = 64$

28. The smallest five digit number beginning with 14 is 14000.
13) 14000 (1076

$$\begin{array}{r} 13 \\ \hline 100 \\ 91 \\ \hline 90 \\ 78 \\ \hline 12 \end{array}$$

∴The required number will be

$$= 14000 + (13 - 12)$$
$$= 14000 + 1$$
$$= 14001$$

29. As we know,
Dividend = Divisor + Quotient + Remainder
Dividend $= 51 \times 16 + 27$
$= 816 + 27 = 843$

Practice Exercise

1. On dividing a number by 9, the quotient is 12 and remainder is 7. The number is
(1) 114 (2) 93 (3) 115 (4) 108

2. What least number must be subtracted from 543 to get a number exactly divisible by 8?
(1) 9 (2) 1 (3) 5 (4) 7

3. The number 4318 should be divided by which number, so that the quotient is 17.
(1) 253 (2) 254 (3) 244 (4) 354

4. What must be added to 2910, so that the quotient is 243 on dividing by 12?
(1) 7 (2) 4 (3) 5 (4) 6

5. Which of the greatest four digits number, is exactly divisible by 88?
(1) 9944 (2) 9988 (3) 9996 (4) 9966

6. Which one of the following numbers is exactly divisible by 11?
(1) 1552 (2) 1331 (3) 1882 (4) 1902

7. If 10 * 4 divisible by 3, the number at * is
(1) 4 (2) 1 (3) 2 (4) 3

8. If the number 325 * 6 is exactly divisible by 3, the number which comes at the place of * is
(1) 4 (2) 2 (3) 3 (4) 1

9. If 34*24 is divisible by 9, the number at * is
(1) 5 (2) 9 (3) 2 (4) 3

10. Find the unit's digit in the product of (4326×5321).
(1) 6 (2) 8
(3) 1 (4) 3

11. The unit's digit in the product $(2467)^{153} \times (341)^{72}$ is
(1) 9 (2) 3 (3) 1 (4) 7

12. A man's monthly salary is ₹ 25000. He spent ₹ 2500 on clothes, ₹ 4000 on food, ₹ 3000 on house rent and ₹ 3500 on education monthly. His monthly saving is
(1) ₹ 1200 (2) ₹ 1800
(3) ₹ 12000 (4) None of these

13. The unit digit in the product of $163 \times 87^* \times 239$ be 1, then the digit that the place of * will be
(1) 1 (2) 3 (3) 7 (4) 9

14. On dividing 55055 by 11, the quotient obtained is
(1) 550 (2) 5005 (3) 505 (4) 50005

15. If the number 9708*3 is divisible by 9 and 3, the number which comes at the place of * is
(1) 0 (2) 1 (3) 3 (4) 6

16. Find the greatest number of 4 digits which is exactly divisible by 75
(1) 9975 (2) 9927 (3) 7799 (4) 9978

Answers

1. (3)	**2.** (4)	**3.** (2)	**4.** (4)	**5.** (1)	**6.** (2)	**7.** (2)	**8.** (2)	**9.** (1)	**10.** (1)
11. (4)	**12.** (3)	**13.** (2)	**14.** (2)	**15.** (1)	**16.** (1)				

Hints and Solutions

1. Dividend = Quotient × Divisor + Remainder
$= 12 \times 9 + 7 = 108 + 7 = 115$

2.
$$\begin{array}{r|l} 8 & 543 \quad (67 \\ & \underline{48} \\ & 63 \\ & \underline{56} \\ & 7 \quad \text{Remainder} \end{array}$$

$\therefore$ 7 is the required least number.

3. The required number $= \frac{4318}{17} = 254$

4. The required number $= (243 \times 12) - 2910$
$= 2916 - 2910 = 6$

5. The greatest number of four digits is 9999.

$$\begin{array}{r|l} 88 & 9999 \quad (113 \\ & \underline{88} \\ & 119 \\ & \underline{88} \\ & 319 \\ & \underline{264} \\ & 55 \end{array}$$

$\therefore$ Required number $= 9999 - 55 = 9944$

6. $\because$ In 1331; $(1 + 3) - (3 + 1) = 0$

[The difference between the sum of digits at even places and sum of the digits at odd places is 0].

7. For divisibility by 3, the sum of digits of a number must be divisible by 3, sum of the digits of the number $10 * 4 = 1 + 0 + 4 = 5$, which must be 6, so the digit at * place must be $(6 - 5) = 1$.

8. For divisibility by 3, the sum of digits of a number must be divisible by 3.

The sum of digits of the number $325 * 6$
$= 3 + 2 + 5 + 6 = 16$, which must be 18.
So, the digit at * place must be $(18 - 16) = 2$.

9. For divisibility by 9, the sum of digits of a number must be divisible by 9.

The sum of digits of the number $34*24$
$= 3 + 4 + 2 + 4 = 13$, which must be 18.
So, the digit at * place must be $(18 - 13) = 5$.

10. Product of unit's digit $= 6 \times 1 = 6$
$\therefore$ Required digit = 6

11. Unit's digit of $(2467) \times (341)$
$= 7 \times 1 = 7$

12. Total spent = 2500 + 4000 + 3000 + 3500
= ₹ 13000,
Salary = ₹ 25000
$\therefore$ His monthly saving = 25000 − 13000
= ₹ 12000

13. $163 \times 87 * \times 239$

The unit digit in product of 3, *, 9 should be 1.
$\therefore$ The required number of * should be 3.
$\because$ $3 \times 3 \times 9 = 81$

14.
$$\begin{array}{r|l} 11 & 55055 \quad (5005 \\ & \underline{55} \\ & 055 \\ & \underline{55} \\ & \times \end{array}$$

15. If the sum of digits of a number is divisible by both 9 and 3, that number will also be divisible by 9 and 3. Here, sum of digits $= 9 + 7 + 0 + 8 + * + 3 = 27 + *$, 27 is divisible by both 9 and 3.
$\therefore$ The number, which comes at the place of * is 0.

16. $9999 \div 75$, remainder = 24
$\therefore$ The required number
$= 9999 - 24$
$= 9975$

Self Practice

1. The greatest number of five digits exactly divisible by 8 is
(1) 99992 (2) 99984 (3) 90000 (4) 10000

2. In the election, a candidate '*A*' gets 252130 votes while, candidate '*B*' gets 113717 votes. Then, the number of votes with which candidate '*A*' wins are
(1) 148413 (2) 138413 (3) 365847 (4) None of these

3. Which one of the numbers is exactly divisible by 3?
(1) 2572 (2) 3411 (3) 2732 (4) 3521

4. Which of the following numbers is exactly divisible by 9?
(1) 20756 (2) 10836 (3) 31525 (4) 53162

5. Which of the numbers is exactly divisible by 8?
(1) 444 (2) 8442 (3) 8096 (4) 8844

6. If 2*345 is divisible by 9 what will come at *?
(1) 4 (2) 1 (3) 9 (4) 8

7. What least number should be subtracted from 413, so that the resulting number is exactly divisible by 13?
(1) 12 (2) 10 (3) 11 (4) 17

8. ₹ 125000 is to be distributed among 5 persons. Then, the share of each person is
(1) ₹ 2500 (2) ₹ 20000 (3) ₹ 25000 (4) ₹ 20005

9. The greatest number of three digits divisible by 5 is
(1) 9990 (2) 990 (3) 995 (4) 105

10. What least number should be added to 64 to make it divisible by 7?
(1) 4 (2) 6 (3) 12 (4) 3

11. The number 7254*38 is divisible by 9, then the number which comes at the place of * is
(1) 4 (2) 7 (3) 6 (4) 5

12. 57244 is divisible by
(1) 11, 4 (2) 4, 7 (3) 7, 11 (4) 7, 9

13. The number between 800 and 900 divisible completely by 13 and 17 is
(1) 878 (2) 884 (3) 888 (4) 868

14. What is the unit digit in $(44 \times 88 \times 11)$?
(1) 1 (2) 3 (3) 2 (4) 5

Answers

1. (1)	**2.** (2)	**3.** (2)	**4.** (2)	**5.** (3)	**6.** (1)	**7.** (2)	**8.** (3)	**9.** (3)	**10.** (2)
11. (2)	**12.** (1)	**13.** (2)	**14.** (3)						

CHAPTER

03

FRACTIONAL NUMBER AND FUNDAMENTAL OPERATIONS

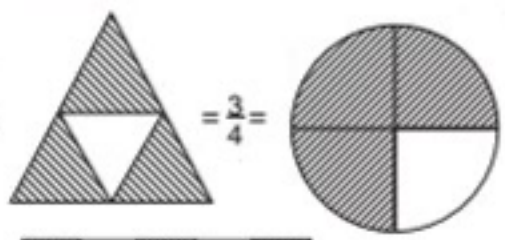
Fraction

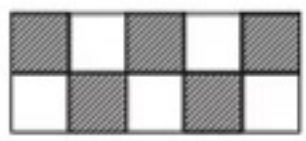
When a number quantity or an object is divided into equal parts, one or more of such equal parts is known as fraction. It is formed as $\frac{x}{y}$, where $y \neq 0$, which represents x number of parts out of y number of equal parts of a object. Every fraction has a numerator and a denominator.

Here, x is called numerator and y is called denominator.

Some figures are given below to understand the fraction in better way.

1. $= \frac{2}{7}$

2.  $= \frac{3}{4} =$

3.  $= \frac{5}{10} = \frac{1}{2}$

Types of Fraction

Proper Fraction

If numerator is less than the denominator of a fraction, then fraction is called proper fraction.

e.g. $\frac{8}{11}, \frac{4}{9}, \frac{19}{27}$ etc.

↗ *The value of proper fraction is always less than* 1.

Improper Fraction

A fraction whose numerator is equal to or greater than the denominator is called an improper fraction.

e.g. $\frac{17}{12}, \frac{12}{7}, \frac{18}{5}$ etc.

↗ *The value of an improper fraction is always more than or equal to* 1.

Mixed Fraction

A fraction combined with whole number part and a fractional part is called mixed fraction.

e.g. $1\frac{7}{16}, 2\frac{9}{4}, 3\frac{4}{11}$ etc.

Equivalent Fractions

Equivalent fractions can be defined as fractions with different numerators and denominators that represent the same value or proportion of the whole.

e.g. $\frac{3}{5}, \frac{6}{10}, \frac{30}{50}$ etc are equal

↗ *The representation of the same ratio as multiplying or dividing numerator and denominator by common factor does not alter the value of the fraction.*

Reciprocal Fraction

If numerator and denominator of a fraction are interchange to each other, then the new fraction is called a reciprocal fraction.

e.g. Reciprocal fraction of $\frac{4}{5}$ is $\frac{5}{4}$.

Addition of Fractions

When Denominators are Equal Here, we simply add the numerators and keep the denominators same as all the denominators of the fraction are given same.

e.g. $\frac{1}{9} + \frac{8}{9} + \frac{5}{9} = \frac{1+8+5}{9} = \frac{14}{9}$

When Fractions are Mixed with Equal Denominators

Here, firstly we add all the whole part and simply add the numerator and keep and denominator same as all the denominators of the fraction are given same. And lastly we sum up these two parts and get the final result.

e.g. $7\frac{2}{8}+4\frac{1}{8}+3\frac{3}{8}=(7+4+3)+\frac{2+1+3}{8}$

$$=14+\frac{6}{8}=14\frac{6}{8}$$

When Denominators are Unequal

If denominators are unequal, then we take the LCM of denominators and make equivalent fraction having same denominator further sum up numerator.

e.g. $\frac{5}{3}+\frac{2}{5}+\frac{3}{10}$

Here, LCM (3, 5, 10) = 30

$\therefore \quad \frac{5}{3}=\frac{5}{3}\times\frac{10}{10}=\frac{50}{30}, \frac{2}{5}=\frac{2}{5}\times\frac{6}{6}=\frac{12}{30}$

and $\frac{3}{10}=\frac{3}{10}\times\frac{3}{3}=\frac{9}{30}$

$\therefore \quad \frac{5}{3}+\frac{2}{5}+\frac{3}{10}=\frac{50+12+9}{30}=\frac{71}{30}$

When Fractions are Mixed with Unequal Denominators

Here, firstly we add all the whole part and fraction part make equivalent fraction having same denominator and further sum up numerator.

e.g., $5\frac{2}{3}+4\frac{1}{2}+3\frac{1}{6}=(5+4+3)+\left(\frac{2}{3}+\frac{1}{2}+\frac{1}{6}\right)$

$$=12+\left(\frac{2\times2+3\times1+1\times1}{6}\right)$$

$$=12+\frac{8}{6}=12+\frac{4}{3}=12+1\frac{1}{3}$$

$$=12+1+\frac{1}{3}=13\frac{1}{3}$$

Subtraction of Fractions

The method of subtraction of fraction is same as that of their addition. Here, we have to take care regarding signs.

When Denominators are Equal

Here, we simply subtract the numerator and keep the denominators same as all the denominators of the fraction are given same.

e.g. $\frac{8}{9}-\frac{4}{9}-\frac{2}{9}=\frac{8-4-2}{9}=\frac{2}{9}$

When Fractions are Mixed with Equal Denominators

Here, firstly we subtract all the whole part and simply subtract the numerator and keep the denominators same as all the denominators of the fraction are given same as. And lastly we sum up there two parts and get the final result.

e.g. $8\frac{7}{4}-4\frac{5}{4}=(8-4)+\frac{7-5}{4}=4+\frac{2}{4}=4\frac{2}{4}$

When Denominators are Unequal

If denominator are unequal, then we take the LCM of denominators and make equivalent fraction having same denominator. Further subtract the numerator

e.g. $\frac{2}{3}-\frac{1}{2}=\frac{2\times2-1\times3}{6}=\frac{4-3}{6}=\frac{1}{6}$

When Fractions are Mixed with Unequal Denominators

Here, firstly we subtract all the whole part and fraction part make equivalent fraction having same denominators and further subtract the numerator.

e.g. $9\frac{1}{3}-8\frac{1}{4}=(9-8)+\frac{1}{3}-\frac{1}{4}=1+\frac{1\times4-1\times3}{3\times4}$

$$=1+\frac{1}{12}=1\frac{1}{12}$$

Multiplication of Fractions

- Convert the mixed fraction, if any into improper fraction.
- Multiply the numerators which gives the numerator of the product and multiply the denominators to get the denominator of the product.

(i) $\frac{1}{3}\times\frac{2}{3}=\frac{1\times2}{3\times3}=\frac{2}{9}$

(ii) $1\frac{2}{3}\times2\frac{3}{1}=\frac{5}{3}\times\frac{5}{1}=\frac{5\times5}{3\times1}=\frac{25}{3}$

Division of Fractions

- First convert mixed fraction into improper fraction, if any is given.
- In division of fraction first of all interchange the position of numerator and denominator of the second fraction.

Now, multiply of first fractioni and interchange second fraction.

e.g. $\frac{1}{4}\div\frac{1}{2}=\frac{1}{4}\times\frac{2}{1}=\frac{2}{4}=\frac{1}{2}$

LCM and HCF of Fractions

Suppose we have fractional number of the form $\frac{a}{b}, \frac{c}{d}$ and $\frac{e}{f}$, then

$$\text{LCM of fractions} = \frac{\text{LCM of numerators } (a,c,e)}{\text{HCF of denominators } (b,d,f)}$$

$$\text{and HCF of fractions} = \frac{\text{HCF of numerators } (a,c,e)}{\text{LCM of denominators}(b,d,f)}$$

Example Find the LCM and HCF of $\frac{3}{8}, \frac{5}{12}$ and $\frac{9}{16}$.

(1) $\frac{45}{4}, \frac{1}{48}$ (2) $\frac{35}{4}, \frac{1}{24}$ (3) $\frac{25}{4}, \frac{1}{12}$ (4) $\frac{1}{12}, \frac{25}{4}$

Sol. **(1)** LCM of $\frac{3}{8}, \frac{5}{12}$ and $\frac{9}{16}$

$$= \frac{\text{LCM of } 3, 5, 9}{\text{HCF of } 8, 12, 16} = \frac{45}{4}$$

HCF of $\frac{3}{8}, \frac{5}{12}$ and $\frac{9}{16}$

$$= \frac{\text{HCF of } 3, 5, 9}{\text{LCM of } 8, 12, 16} = \frac{1}{48}$$

Comparison of Fraction

Firstly, we change the given fraction in decimal fraction and compare them from compare, we can write of fractions in ascending and descending orders.

e.g.

(i) greater fraction in $\frac{1}{2}, \frac{3}{4}$ and $\frac{5}{6}$

$\frac{1}{2} = 0.5; \frac{3}{4} = 0.75; \frac{5}{6} = 0.833\ldots$

So, $\frac{5}{6}$ is greater fraction.

(ii) Descending order of $\frac{7}{12}, \frac{5}{8}$ and $\frac{11}{15}$ can be determined as the following way.

$$\frac{7}{12} = 0.59, \frac{5}{8} = 0.63, \frac{11}{15} = 0.74$$

Clearly, $0.74 > 0.63 > 0.59$

$\therefore$ $\frac{11}{15} > \frac{5}{8} > \frac{7}{12}$

Important Facts

- In two or more fractions, if denominators are same, then fraction with greater numerator is greater and fraction with lesser numerator is lesser.
- In two or more fractions, if numerators are same, then fraction with greater denominator is lesser and fraction with lesser denominator is greater.
- If difference between numerator and denominator of given fractions are same then the fraction having the greatest numerator is greatest and the fraction having the lowest numerator is lowest.

Entrance Corner

1. There are 500 eggs in a box. $\frac{3}{25}$ got broken, $\frac{4}{5}$ of the remaining eggs were sold. The number of eggs left is [JNV 2019]

(1) 80 (2) 88
(3) 40 (4) 36

2. A drum is $\frac{2}{3}$ full, if 50 L more required to fill it up, how much is the capacity of the drum? [JNV 2019]

(1) 150 L (2) 120 L
(3) 100 L (4) 90 L

3. $\frac{3}{4}$th of 144 is how much greater than $\frac{2}{3}$rd of 96? [JNV 2015]

(1) 20 (2) 44
(3) 54 (4) 64

4. 1/5th part of a drum is filled with milk. What is the capacity of drum if it require 28 L more to fall the drum completely? [JNV 2014]

(1) 30 L (2) 32 L
(3) 35 L (4) 140 L

5. $\frac{1}{3}$rd of a drum is filled with water. If need another 60 L water to filled whole drum, then what is the capacity of drum? [JNV 2013]

(1) 120 L (2) 90 L (3) 60 L (4) 30 L

6. What should be taken out of $\frac{3}{7}$ to get $\frac{2}{7}$? [JNV 2012]

(1) $\frac{5}{7}$ (2) 1 (3) $\frac{1}{7}$ (4) $\frac{3}{7}$

7. $\frac{1}{3}$rd of a property is worth ₹ 1500.Find $\frac{1}{5}$th of the property. [JNV 2012]

(1) ₹ 600 (2) ₹ 900 (3) ₹ 1200 (4) ₹ 1000

8. The sum of the fraction $\frac{2}{9}$, $\frac{4}{3}$ and $\frac{6}{18}$ is [JNV 2011]

(1) $\frac{17}{9}$ (2) $\frac{16}{9}$
(3) $\frac{2}{5}$ (4) $\frac{11}{18}$

9. The value of $5-\left(2\frac{1}{2}-\frac{3}{4}\right)+\left(3\frac{1}{2}-1\frac{1}{4}\right)$ is [JNV 2007]

(1) $4\frac{1}{2}$ (2) $5\frac{1}{2}$
(3) $5\frac{1}{4}$ (4) $3\frac{1}{2}$

10. Which of the following numbers are in ascending order? [JNV 2004]

(1) $\frac{1}{3}, \frac{1}{2}, 0.25$ (2) $0.25, \frac{1}{2}, \frac{1}{3}$
(3) $0.25, \frac{1}{3}, \frac{1}{2}$ (4) $\frac{1}{2}, \frac{1}{3}, 0.25$

11. The sum of the fractions $\frac{4}{3}$, $\frac{5}{9}$ and $\frac{6}{18}$ is [JNV 2003]

(1) $\frac{2}{5}$ (2) $\frac{11}{18}$
(3) $\frac{19}{9}$ (4) $\frac{20}{9}$

12. The product of two numbers is $\frac{5}{4}$. If one number is $\frac{5}{6}$, what is the other number? [JNV 2002]

(1) 2 (2) $\frac{1}{2}$ (3) $\frac{3}{2}$ (4) $\frac{2}{3}$

13. The correct arrangement of the fractional numbers $\frac{17}{25}$, $\frac{17}{13}$, $\frac{17}{19}$ and $\frac{17}{27}$ in ascending order is [JNV 2001]

(1) $\frac{17}{19}, \frac{17}{13}, \frac{17}{27}, \frac{17}{25}$ (2) $\frac{17}{27}, \frac{17}{25}, \frac{17}{19}, \frac{17}{13}$
(3) $\frac{17}{27}, \frac{17}{19}, \frac{17}{13}, \frac{17}{25}$ (4) $\frac{17}{13}, \frac{17}{25}, \frac{17}{19}, \frac{17}{27}$

14. Which of the following is the largest fraction? [JNV 2000]

(1) $\frac{5}{6}$ (2) $\frac{9}{10}$ (3) $\frac{7}{9}$ (4) $\frac{10}{11}$

15. Which of the following is the smallest fraction? [JNV 1999]

(1) $\frac{1}{10}$ (2) $\frac{2}{15}$ (3) $\frac{3}{8}$ (4) $\frac{4}{9}$

16. $\frac{5}{6}$ of an hour is equal to [JNV 1999]

(1) $\frac{1}{2}$ h (2) 40 min
(3) 50 min (4) 55 min

17. $\frac{4}{5}$ of 0.025 is equal to [JNV 1999]

(1) 0.0002 (2) 0.002 (3) 0.02 (4) 0.2

18. Find the product of $0.4 \times 0.04 \times 0.004$. [JNV 1998]

(1) 0.00064 (2) 0.0064
(3) 64 (4) 0.000064

19. $\frac{1}{3}$rd part of a certain amount was given to Sita and rest to Gita. If Gita got ₹ 524, what did Sita get? [JNV 1998]

(1) ₹ 262 (2) ₹ 412 (3) ₹ 200 (4) ₹ 400

20. Simplify $\frac{8 \times 21 \times 24}{48 \times 7 \times 15}$. [JNV 1998]

(1) $\frac{3}{5}$ (2) $\frac{4}{5}$ (3) $\frac{1}{7}$ (4) $\frac{1}{2}$

21. Which fraction should be added to the sum of $5\frac{3}{4}$, $4\frac{4}{5}$ and $7\frac{3}{8}$ to make the result a whole number? [JNV 1998]

(1) $\frac{1}{40}$ (2) $\frac{2}{40}$ (3) $\frac{3}{40}$ (4) $\frac{4}{40}$

22. $2.205 \div 0.15$ is equal to [JNV 1997]

(1) 1.47 (2) 14.7
(3) 147 (4) 0.147

23. Which is the smallest fraction? [JNV 1997]

(1) $\frac{2}{5}$ (2) $\frac{7}{5}$ (3) $\frac{6}{5}$ (4) $\frac{7}{8}$

24. The product of two fractions is 6. If one fraction is $\frac{5}{3}$. Find the other. [JNV 1997]

(1) $\frac{3}{5}$ (2) $\frac{4}{5}$ (3) $\frac{18}{5}$ (4) $\frac{12}{5}$

25. In a class of 30 students the number of girls is $\frac{1}{5}$th of the number of the boys. How many boys are there in the class? [JNV 1997]

(1) 25 (2) 18 (3) 20 (4) 19

26. $\frac{1}{3}$rd of a number is 15. Find $\frac{1}{5}$th of the number. [JNV 1997]

(1) 9 (2) 6 (3) 4 (4) 5

27. If $\frac{4}{5}$ of an estate be worth ₹ 1680, find the value of half of the estate. [JNV 1996]

(1) ₹ 1080 (2) ₹ 1200 (3) ₹ 1000 (4) ₹ 1050

28. By how much does $\frac{6}{7/8}$ exceed $\frac{6/7}{8}$? [JNV 1996]

(1) $6\frac{2}{3}$ (2) $6\frac{3}{4}$ (3) $7\frac{1}{2}$ (4) $8\frac{3}{4}$

29. Arrange there fractions in ascending order $\frac{3}{4}, \frac{1}{6}, \frac{9}{8}, \frac{10}{13}$. [JNV 1995]

(1) $\frac{9}{8}, \frac{1}{6}, \frac{3}{4}, \frac{10}{13}$ (2) $\frac{10}{13}, \frac{9}{8}, \frac{1}{6}, \frac{3}{4}$

(3) $\frac{3}{4}, \frac{9}{8}, \frac{1}{6}, \frac{10}{13}$ (4) $\frac{1}{6}, \frac{3}{4}, \frac{10}{13}, \frac{9}{8}$

30. Arrange these fractions in descending order $\frac{5}{6}, \frac{7}{8}, \frac{2}{3}, \frac{1}{7}$. [JNV 1995]

(1) $\frac{7}{8}, \frac{5}{6}, \frac{2}{3}, \frac{1}{7}$ (2) $\frac{5}{6}, \frac{1}{7}, \frac{2}{3}, \frac{7}{8}$

(3) $\frac{5}{6}, \frac{7}{8}, \frac{2}{3}, \frac{1}{7}$ (4) $\frac{1}{7}, \frac{2}{3}, \frac{5}{6}, \frac{7}{8}$

Answers

1. (2)	**2.** (1)	**3.** (2)	**4.** (3)	**5.** (2)	**6.** (3)	**7.** (2)	**8.** (1)	**9.** (2)	**10.** (3)
11. (4)	**12.** (3)	**13.** (2)	**14.** (4)	**15.** (1)	**16.** (3)	**17.** (3)	**18.** (4)	**19.** (1)	**20.** (2)
21. (3)	**22.** (2)	**23.** (1)	**24.** (3)	**25.** (1)	**26.** (1)	**27.** (4)	**28.** (2)	**29.** (4)	**30.** (1)

Hints and Solutions

1. According to the question,

Total eggs = 500

$\frac{3}{25}$ got broken i.e. broken eggs = $\frac{3}{25} \times 500 = 60$

$\therefore$ Remaining eggs = 500 − 60 = 440

Now, $\frac{4}{5}$ of the remaining eggs were sold i.e.

$= \frac{4}{5} \times 440 = 88 \times 4 = 352$

Hence, number of eggs left = 500 − (60 + 352)

= 500 − 412 = 88

2. $\because$ Empty part of the drum = $1 - \frac{2}{3} = \frac{1}{3}$

If $\frac{1}{3}$ part requires = 50 L

Then, 1 part requires = $50 \div \frac{1}{3} = 50 \times 3 = 150$ L

3. According to the question, $\frac{3}{4}$ th of 144

$= 144 \times \frac{3}{4} = 108$ and $\frac{2}{3}$rd of $96 = 96 \times \frac{2}{3} = 64$

$\therefore$ Required difference = 108 − 64 = 44

4. Fraction of drum filled with = $\frac{1}{5}$

Remaining part = $1 - \frac{1}{5} = \frac{4}{5}$

According to the question, $\frac{4}{5}$ part = 28 L

4 part = 28 × 5 = 140 L

1 part = $\frac{140}{4}$ = 35 L

5. Suppose capacity of the drum = x L

Water in drum = $\frac{x}{3}$ L

Then, $x - \frac{x}{3} = 60 \Rightarrow \frac{3x - x}{3} = 60$

$\Rightarrow \quad \frac{2x}{3} = 60 \Rightarrow 2x = 180$

$\therefore \quad x = 90$ L

6. Let x be taken out.

Then, $\frac{3}{7} - x = \frac{2}{7} \Rightarrow x = \frac{3}{7} - \frac{2}{7} \Rightarrow x = \frac{1}{7}$

7. Suppose total property = ₹ x

Then, $x \times \frac{1}{3} = 1500 \Rightarrow x = 1500 \times 3$

$\Rightarrow \quad x =$ ₹ 4500

$\therefore$ $\frac{1}{5}$ th of the property = $4500 \times \frac{1}{5} =$ ₹ 900

8. Sum of the fraction

$= \frac{2}{9} + \frac{4}{3} + \frac{6}{18} = \frac{4 + 24 + 6}{18} = \frac{34}{18} = \frac{17}{9}$

9. $5-\left[\frac{5}{2}-\frac{3}{4}\right]+\left[\frac{7}{2}-\frac{5}{4}\right]=5-\left[\frac{10-3}{4}\right]+\left[\frac{14-5}{4}\right]$

$=5-\frac{7}{4}+\frac{9}{4}=\frac{20-7+9}{4}=\frac{22}{4}=\frac{11}{2}=5\frac{1}{2}$

10. $\because \quad \frac{1}{3}=0.33, \frac{1}{2}=0.50$

$\therefore$ In ascending order the numbers will be written as $0.25<0.33<0.50$ or $0.25, \frac{1}{3}, \frac{1}{2}$

11. $\frac{4}{3}+\frac{5}{9}+\frac{6}{18}=\frac{6\times4+2\times5+1\times6}{18}$

$=\frac{24+10+6}{18}=\frac{40}{18}=\frac{20}{9}$

12. $\because$ Product of two numbers $=\frac{5}{4}$

One number $=\frac{5}{6}$

Other number $=\frac{5}{4}\div\frac{5}{6}=\frac{5}{4}\times\frac{6}{5}=\frac{3}{2}$

13. $\frac{17}{27}, \frac{17}{25}, \frac{17}{19}, \frac{17}{13}$ are in ascending order.

(In like fractions with equal numerators, the fraction with greatest denominators is the smallest.)

14. $\frac{5}{6}=0.833, \frac{9}{10}=0.900, \frac{7}{9}=0.777, \frac{10}{11}=0.090$

$\therefore$ Largest fraction $=\frac{10}{11}$

15. $\frac{1}{10}=0.1, \frac{2}{15}=0.13, \frac{3}{8}=0.375, \frac{4}{9}=0.444$

$\therefore$ Smallest fraction $=\frac{1}{10}$

16. $\frac{5}{6}$ of 1 h $=\frac{5}{6}\times60$ min $=50$ min

17. $\frac{4}{5}\times0.025=\frac{4}{5}\times\frac{25}{1000}=\frac{1}{50}=0.02$

18. $0.4\times0.04\times0.004=0.000064$

19. Let the total amount be ₹ x.

$\therefore$ Gita get $=x-\frac{x}{3}=\frac{3x-x}{3}=₹\frac{2x}{3}$

According to the question,

$\frac{2x}{3}=524\Rightarrow 2x=3\times524\Rightarrow x=\frac{3\times524}{2}=₹786$

Sita get $=786\times\frac{1}{3}=₹262$

20. $\frac{8\times21\times24}{48\times7\times15}=\frac{4032}{5040}=\frac{4}{5}$

21. $5\frac{3}{4}+4\frac{4}{5}+7\frac{3}{8}=\frac{23}{4}+\frac{24}{5}+\frac{59}{8}=\frac{717}{40}$

$\frac{717}{40}$ becomes whole number when $\frac{3}{40}$ is added to it.

$\frac{717}{40}+\frac{3}{40}=\frac{720}{40}=18$

Which is a whole number.

22. $2.205\div0.15=\frac{2.205}{0.15}=\frac{2205}{1000}\times\frac{100}{15}=\frac{2205}{150}$

$=14.7$

23. $\frac{2}{5}=0.4, \frac{7}{5}=1.4, \frac{6}{5}=1.2, \frac{7}{8}=0.875$

$\therefore$ $\frac{2}{5}$ is the smallest fraction.

24. Let the other fraction be x.

Then, $\quad x\times\frac{5}{3}=6\Rightarrow\frac{5x}{3}=6$

$\therefore \quad x=\frac{6\times3}{5}=\frac{18}{5}$

25. Let the number of boys be x.

Then, number of girls is $\frac{x}{5}$.

According to the question, $x+\frac{x}{5}=30$

$\Rightarrow\frac{6x}{5}=30\Rightarrow 6x=5\times30\Rightarrow x=\frac{5\times30}{6}=25$

$\therefore$ Number of boys $=25$

26. Let the number be x. Then, $\frac{1}{3}x=15\Rightarrow x=45$

Then, $\frac{x}{5}$ of $45=45\times\frac{1}{5}=9$

27. Let the value of estate be ₹ x.

According to the question, $\frac{4x}{5}=1680$

$\therefore \quad x=\frac{1680\times5}{4}=₹2100$

Value of half of the estate $=\frac{1}{2}\times2100=₹1050$

28. $6\div\frac{7}{8}=6\times\frac{8}{7}=\frac{48}{7}, \quad \frac{6}{7}\div8=\frac{6}{7}\times\frac{1}{8}=\frac{3}{28}$

$\frac{48}{7}-\frac{3}{28}=\frac{192-3}{28}=\frac{189}{28}=6\frac{21}{28}=6\frac{3}{4}$

29. $\frac{3}{4}=0.75, \frac{1}{6}=0.166, \frac{9}{8}=1.125, \frac{10}{13}=0.769$

Ascending order, 0.16, 0.75, 0.76, 1.125

i.e., $\frac{1}{6}, \frac{3}{4}, \frac{10}{13}, \frac{9}{8}$

30. $\frac{5}{6}=0.833, \frac{7}{8}=0.875, \frac{2}{3}=0.66, \frac{1}{7}=0.142$

Descending order, 0.875, 0.833, 0.66, 0.142

i.e., $\frac{7}{8}, \frac{5}{6}, \frac{2}{3}, \frac{1}{7}$

Practice Exercise

1. $12 + \frac{\square}{6} = 13\frac{1}{6}$, which number should be written $\square$ to prove statement true?

(1) 1 (2) 7 (3) 13 (4) 25

2. Which of the following fractions is not equal to the other three?

(1) 4/5 (2) 9/15 (3) $\frac{3}{5}$ (4) $\frac{6}{10}$

3. Which of the following numbers are in ascending order?

(1) $\frac{12}{19}, \frac{12}{25}, \frac{12}{29}, \frac{12}{37}$ (2) $\frac{12}{29}, \frac{12}{37}, \frac{12}{19}, \frac{12}{25}$

(3) $\frac{12}{37}, \frac{12}{29}, \frac{12}{19}, \frac{12}{25}$ (4) $\frac{12}{37}, \frac{12}{29}, \frac{12}{25}, \frac{12}{19}$

4. $\frac{2}{3} + \frac{5}{7}$ is equal to

(1) $\frac{2+5}{3+7}$ (2) $\frac{2+5}{3\times7}$

(3) $\frac{2\times7+3\times5}{3+7}$ (4) $\frac{2\times7+3\times5}{3\times7}$

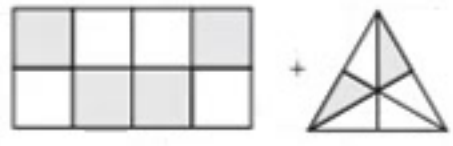
5. The product of $3\frac{1}{2}$ and $3\frac{1}{2}$ is

(1) 7 (2) $9\frac{1}{2}$ (3) $9\frac{1}{4}$ (4) $12\frac{1}{4}$

6. $1\frac{2}{3} \times 1\frac{3}{5}$ is equal to

(1) $2\frac{2}{3}$ (2) $1\frac{2}{5}$ (3) $2\frac{2}{5}$ (4) $1\frac{5}{8}$

7. Find the value of



(1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{1}{6}$ (4) $\frac{5}{6}$

8. $2\frac{1}{2} \times 3\frac{1}{3} \times 4\frac{1}{4}$ is equal to

(1) $9\frac{1}{24}$ (2) $24\frac{1}{24}$ (3) $29\frac{1}{24}$ (4) $35\frac{5}{12}$

9. Write in ascending order of the following fractional numbers $\frac{5}{17}, \frac{9}{17}, \frac{8}{17}$ and $\frac{10}{17}$.

(1) $\frac{10}{17}, \frac{9}{17}, \frac{8}{17}, \frac{5}{17}$ (2) $\frac{8}{17}, \frac{5}{17}, \frac{10}{17}, \frac{9}{17}$

(3) $\frac{5}{17}, \frac{9}{17}, \frac{10}{17}, \frac{8}{17}$ (4) $\frac{5}{17}, \frac{8}{17}, \frac{9}{17}, \frac{10}{17}$

10. Which one of the following fractions are expressed in descending order?

(1) $\frac{17}{25}, \frac{17}{27}, \frac{17}{13}, \frac{17}{19}$ (2) $\frac{17}{13}, \frac{17}{19}, \frac{17}{25}, \frac{17}{27}$

(3) $\frac{17}{27}, \frac{17}{19}, \frac{17}{13}, \frac{17}{25}$ (4) $\frac{17}{27}, \frac{17}{19}, \frac{17}{25}, \frac{17}{13}$

11. The product of two numbers is 5/4. If one number is 5/6, what is the other number?

(1) 2 (2) $\frac{1}{2}$ (3) $\frac{3}{2}$ (4) $\frac{2}{3}$

12. There is 500 eggs in a box. 4/25 eggs were broken, 2/5 of remaining eggs were sold. The number of eggs left is

(1) 80 (2) 252 (3) 100 (4) 120

13. Mohan Lal gives 1/4th part of his total money to his son, 1/3rd part to his wife and 1/8th part to his daughter. Then, remaining part of his money is

(1) $\frac{7}{24}$ (2) $\frac{5}{24}$ (3) $\frac{11}{24}$ (4) $\frac{1}{8}$

14. Which of the following fractions is greatest?

$$\frac{7}{12}, \frac{11}{16}, \frac{12}{17}, \frac{13}{18}, \frac{31}{36}$$

(1) $\frac{13}{18}$ (2) $\frac{12}{17}$ (3) $\frac{31}{36}$ (4) $\frac{7}{12}$

15. If one-fifth of one-fourth of a number is $\frac{5}{80}$, find the number.

(1) $\frac{4}{5}$ (2) $\frac{5}{4}$ (3) $\frac{2}{3}$ (4) $\frac{3}{2}$

16. What is the $\frac{3}{4}$th of $\frac{1}{5}$ of given figure?

(1) $\frac{1}{30}$ (2) $\frac{3}{40}$ (3) $\frac{3}{20}$ (4) $\frac{5}{24}$

17. If $\frac{2}{3}, \frac{23}{30}, \frac{9}{10}, \frac{11}{15}$ and $\frac{4}{5}$ are written in ascending order, then the fraction in the middle most will be

(1) $\frac{23}{30}$ (2) $\frac{4}{5}$ (3) $\frac{2}{3}$ (4) $\frac{11}{15}$

Answers

1. (2)	**2.** (1)	**3.** (4)	**4.** (4)	**5.** (4)	**6.** (1)	**7.** (4)	**8.** (4)	**9.** (4)	**10.** (2)
11. (3)	**12.** (2)	**13.** (1)	**14.** (3)	**15.** (2)	**16.** (2)	**17.** (1)			

Hints and Solutions

1. $12+\frac{\square}{6}=13\frac{1}{6} \Rightarrow \frac{72+\square}{6}=\frac{79}{6}$

$\square = 79-72 = 7$

2. (1) $\frac{4}{5}=\frac{4}{5}$ (2) $\frac{9}{15}=\frac{3}{5}$ (in its lowest term)

(3) $\frac{3}{5}=\frac{3}{5}$ (4) $\frac{6}{10}=\frac{3}{5}$ (in its lowest term)

As, (2), (3) and (4) are equal.

Hence, only $\frac{4}{5}$, i.e., (1) is not equal to other three fractions.

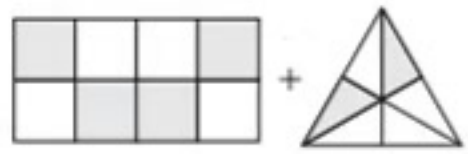
3. When the numerators are the same, the ascending order is determined by the descending order of the denominators.

4. $\because \frac{2}{3}+\frac{5}{7}=\frac{2\times7+3\times5}{3\times7}$

5. $3\frac{1}{2}\times3\frac{1}{2}=\frac{7}{2}\times\frac{7}{2}=\frac{49}{4}=12\frac{1}{4}$

6. $1\frac{2}{3}\times1\frac{3}{5}=\frac{5}{3}\times\frac{8}{5}=\frac{8}{3}=2\frac{2}{3}$

7.



$=\frac{4}{8}+\frac{2}{6}=\frac{1}{2}+\frac{1}{3}=\frac{3+2}{6}=\frac{5}{6}$

8. $2\frac{1}{2}\times3\frac{1}{3}\times4\frac{1}{4}=\frac{5}{2}\times\frac{10}{3}\times\frac{17}{4}$

$=\frac{850}{24}=\frac{425}{12}=35\frac{5}{12}$

9. When the denominators are the same, the ascending order is determined by the ascending order of numerators.

i.e. $\frac{5}{17}, \frac{8}{17}, \frac{9}{17}, \frac{10}{17}$

10. Since, numerators are same.

So, descending order,

$\frac{17}{13}, \frac{17}{19}, \frac{17}{25}, \frac{17}{27}$

11. The product of two numbers $=\frac{5}{4}$

One number $=\frac{5}{6}$

Other number $=\frac{5}{4}\div\frac{5}{6}=\frac{5}{4}\times\frac{6}{5}=\frac{3}{2}$

12. Total eggs = 500

Number of broken eggs $=500\times\frac{4}{25}=80$

$\therefore$ Remaining eggs $=500-80=420$

Number of sold eggs $=420\times\frac{2}{5}=168$

Hence, required remaining eggs $=420-168$

$=252$

13. Remaining part of money $=1-\left(\frac{1}{4}+\frac{1}{3}+\frac{1}{8}\right)$

$=1-\left(\frac{6+8+3}{24}\right)=1-\frac{17}{24}=\frac{24-17}{24}=\frac{7}{24}$

14. Here, difference between numerator and denominator of all the fractions is 5. Therefore, the fraction with greatest numerator is the greatest.

Hence, $\frac{31}{36}$ is the greatest amongst the given fractions.

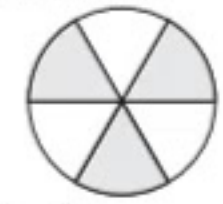
15. Let the required number be x.

Then, $\frac{1}{5}\times\frac{1}{4}\times x=\frac{5}{80}, \quad x=\frac{5}{80}\times5\times4=\frac{5}{4}$

Hence, the required number is $\frac{5}{4}$.

16. It is clear from the figure that the fraction is

$\frac{3}{6}=\frac{1}{2}$



$\therefore$ Required value

$=\frac{3}{4}\times\frac{1}{5}\times\frac{1}{2}=\frac{3}{40}$

17. $\frac{2}{3}, \frac{23}{30}, \frac{9}{10}, \frac{11}{15}, \frac{4}{5}=\frac{20}{30}, \frac{23}{30}, \frac{27}{30}, \frac{22}{30}, \frac{24}{30}$

In ascending order, $\frac{20}{30}, \frac{22}{30}, \frac{23}{30}, \frac{24}{30}, \frac{27}{30}$

$\therefore$ Required fraction $=\frac{23}{30}$

Self Practice

1. Which is the greatest fraction in $\frac{2}{3}, \frac{2}{5}, \frac{1}{2}, \frac{1}{3}$?

(1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{2}{5}$ (4) $\frac{2}{3}$

2. $\frac{1}{8} - \frac{1}{9}$ is equal to

(1) $\frac{1}{72}$ (2) $\frac{1}{36}$ (3) $\frac{3}{72}$ (4) $\frac{7}{72}$

3. $\frac{1}{4} \times \frac{4}{5} \times \frac{5}{7} \times \frac{14}{25}$ is equal to

(1) $\frac{2}{25}$ (2) $\frac{1}{25}$ (3) $\frac{3}{25}$ (4) $\frac{4}{25}$

4. $\frac{2}{7}$th part of a certain sum was donated and $\frac{1}{4}$th was spent on education. The balance amount will be

(1) $\frac{13}{28}$ (2) $\frac{11}{28}$ (3) $\frac{5}{28}$ (4) $\frac{14}{28}$

5. If $\frac{3}{4}x = 48$, the value of x is

(1) 16 (2) 64 (3) 40 (4) 72

6. What is subtracted from 3/4 to get remainder 2/3?

(1) $\frac{1}{2}$ (2) $\frac{2}{12}$ (3) $\frac{1}{3}$ (4) $\frac{1}{12}$

7. Which is the smallest fraction?

(1) $\frac{3}{5}$ (2) $\frac{1}{2}$ (3) $\frac{2}{3}$ (4) $\frac{3}{4}$

8. $\frac{7 \times 7 \times 7}{21 \times 21 \times 21}$ is equal to

(1) $\frac{21}{63}$ (2) $\frac{1}{27}$ (3) $\frac{21}{42}$ (4) $\frac{1}{9}$

9. $3\frac{1}{5} \div 1\frac{2}{3}$ is equal to

(1) $\frac{46}{25}$ (2) $\frac{48}{25}$ (3) $\frac{44}{25}$ (4) $\frac{42}{25}$

10. On subtracting $\frac{1}{3}$ from 2, what will remain?

(1) $1\frac{1}{3}$ (2) $1\frac{2}{3}$ (3) $\frac{4}{3}$ (4) $1\frac{1}{2}$

11. $\frac{45 \times 36}{9}$ is equal to

(1) 160 (2) 170 (3) 180 (4) 190

Answers

1. (4)	**2.** (1)	**3.** (1)	**4.** (1)	**5.** (2)	**6.** (4)	**7.** (2)	**8.** (2)	**9.** (2)	**10.** (2)
11. (3)									

CHAPTER

04

FACTORS AND MULTIPLES INCLUDING THEIR PROPERTIES

Factors

If a number is exactly divisible by the another number, without leaving any remainder, then the second number is said to be a factor of first number. In other words, an exact divisor of a number is called a factor of the number.

- 1 is the factor of every number.
- Every number is a factor of itself.
- Factors of a number are less than or equal to that number.
- Number of factors of that number are finite.

Example **1.** Find number of factors of 250.

(1) 7 (2) 8 (3) 9 (4) 6

Sol. **(2)** $250 = 2\times125 = 5\times50 = 10\times25 = 250\times1$

So, 1, 2, 5, 10, 25, 50, 125 and 250 are all factors of 250.

Hence, number of factors of 250 is 8.

Common Factors

When we find the factors of two or more numbers and then find some factors are the same ("Common") then they are the "Common Factors".

Example **2.** What are the common factors of 20 and 25?

(1) 4 (2) 5 (3) 6 (4) 7

Sol. **(2)** The factors of 20 = 1, 2, 4, 5, 10, 20

The factors of 25 = 1, 5, 25

and the common factors of 20 and 25 are 1 and 5.

Multiples

A multiple of a number is the number obtained by multiplying it with other (or same) number. In other words, the product of two or more numbers is said to be a multiple of each of those numbers.

e.g. $5\times1 = 5, 5\times2 = 10, 5\times3 = 15, 5\times4 = 20$; Hence, 5, 10, 15 and 20 all are multiples of 5.

- Multiple of a number is greater than or equal to that number.
- Every number is a multiple of itself.
- Every multiple of a number is exactly divisible by the number. Number of multiples of a number are infinite.

Example **3.** Find the first five multiples of 20 between 100 and 300.

(1) 125, 130, 145, 165, 180

(2) 115, 130, 145, 165, 180

(3) 125, 135, 145, 165, 180

(4) 120, 140, 160, 180, 200

Sol. **(4)** Multiples of 20 between 100 and 300 are 120 (20×6), 140 (20×7), 160 (20×8), 180 (20×9), 200 (20×10).

Common Multiples

A number that can be divided exactly by two or more different numbers.

e.g. common multiple of 24 and 36 is 4, because

$$4\times6 = 24, 4\times9 = 36$$

Prime Factor

The prime factors of a quantity are all of the prime quantities that will exactly divide the given quantity.

e.g. $28 = 2\times2\times7$ etc.

Example **4.** Find the prime factors of 96.

(1) 4 (2) 5 (3) 6 (4) 7

Sol. **(3)** $96 = 2\times48 = 2\times2\times24$

$= 2\times2\times2\times12 = 2\times2\times2\times2\times6 = 2\times2\times2\times2\times2\times3$

Thus, the prime factors of 96 are 2, 2, 2, 2, 2 and 3.

Entrance Corner

1. Which of the following numbers is divisible by 3, 4, 5 and 6? [JNV 2019]
(1) 36 (2) 60 (3) 80 (4) 90

2. A common multiple of both 9 and 7 is *A*. This number is in between 1200 and 1300. What is number *A*? [JNV 2018]
(1) 1197 (2) 1260 (3) 1206 (4) 1266

3. The sum of the first four multiples of 6, is [JNV 2016]
(1) 66 (2) 56 (3) 72 (4) 60

4. The sum of first five multiple of 6 is [JNV 2015]
(1) 90 (2) 54 (3) 30 (4) 84

5. The difference between ten's digit and unit's digit of the sum of the first five multiple of 6 is [JNV 2015]
(1) 6 (2) 7 (3) 8 (4) 9

6. Which of the following is not a factor of 316? [JNV 2011, 2002]
(1) 1 (2) 8 (3) 79 (4) 158

7. What is the prime factorization of 37800?
(1) $2\times2\times3\times3\times5\times5\times7\times7$ [JNV 2005]
(2) $2\times2\times2\times3\times3\times3\times5\times5\times7$
(3) $8\times27\times25\times7$
(4) $2\times4\times25\times27\times7$

8. Factors of 30 are [JNV 2004]
(1) 2, 3, 5 (2) 1, 2, 3, 5, 110
(3) 1, 2, 3, 10, 15 (4) 1, 2, 3, 5, 6, 10, 15, 30

9. How many times does 9 come in writing the number from 1 to 100? [JNV 2004]
(1) 9 (2) 100 (3) 20 (4) 21

10. The number of prime factors of 105 is [JNV 2001]
(1) 2 (2) 3 (3) 4 (4) 5

11. The total number of the factors of 24 is [JNV 2000]
(1) 8 (2) 7 (3) 4 (4) 9

12. The factor of each odd number is [JNV 1999]
(1) 0 (2) 1
(3) 3 (4) 5

Answers

1. (2)	**2.** (2)	**3.** (4)	**4.** (1)	**5.** (4)	**6.** (2)	**7.** (2)	**8.** (4)	**9.** (3)	**10.** (2)
11. (1)	**12.** (2)								

Hints and Solutions

1. From the options,
Multiples of $60 = 2\times2\times3\times5$ or $4\times3\times5$ or 6×10
Hence, number 60 is divisible by 3,4,5 and 6.

2. A common multiple of 9 and 7 both is *A*.
Then number will completely divide both 9 and 7. We observed that only two numbers 1197 and 1260 is in between 1200 and 1300 is completely divide by 9 and 7. But only number 1260.
Thus, the number *A* is 1260.

3. First four multiple of 6 = 6, 12, 18 and 24
Then, require sum $= 6 + 12 + 18 + 24$
$= 60$

4. First five multiple of 6 is as follows 6×1, 6×2, 6×3, 6×4, 6×5. or 6, 12, 18, 24, 30
$\therefore$ Required sum $= 6 + 12 + 18 + 24 + 30 = 90$

5. First five multiple of 6 is as follows 6×1, 6×2, 6×3, 6×4, 6×5 or 6, 12, 18, 24, 30
$\because$ Sum of first five multiple of 6
$= 6 + 12 + 18 + 24 + 30 = 90$
$\therefore$ Required difference of ten's and unit's digits
$= 9 - 0 = 9$

6. $\because$ Factors of 316 are 1×316, 2×158 and 4×79
(1, 2, 4, 79, 158, 316)
$\therefore$ 8 is not a factor of 316.

7.

2	37800
2	18900
2	9450
3	4725
3	1575
3	525
5	175
5	35
	7

∴ Prime factorization
$= 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 7$

8. Factors of 30 are
$1 \times 30, 2 \times 15, 3 \times 10$ and 5×6
∴ Factors of 30 are
1, 2, 3, 5, 6, 10, 15, 30

9. 9, 19, 29, 39, 49, 59, 69, 79, 89 = 9
90, 91, 92, 93, 94, 95, 96, 97, 98 = 9
99 = 2
Total = 20

10.

3	105
5	35
	7

Prime factors of 105 are 3, 5 and 7.
∴ Number of factors of 105 = 3

11. All the factors of 24 are 1×24,
$2 \times 12, 3 \times 8$ and 4×6
So, number of factors are
(1, 2, 3, 4, 6, 8, 12, 24) = 8

12. 1 is the factor of each odd number.

Practice Exercise

1. The total number of the factors of 81 is
(1) 6 (2) 5 (3) 4 (4) 7

2. The total number of the factors of 54 is
(1) 6 (2) 8 (3) 7 (4) 5

3. The prime factors of 120 are
(1) $2 \times 2 \times 3 \times 8$ (2) $2 \times 9 \times 5$
(3) $2 \times 2 \times 2 \times 6$ (4) $2 \times 2 \times 2 \times 3 \times 5$

4. The prime factors of 48 are
(1) $2 \times 2 \times 12$ (2) 2×24
(3) $2 \times 2 \times 2 \times 6$ (4) $2 \times 2 \times 2 \times 2 \times 3$

5. What are the numbers of multiples of 5 which are less than 45?
(1) 9 (2) 8 (3) 7 (4) 10

6. Which of the following is not a factor of 144?
(1) 2 (2) 3 (3) 5 (4) 1

7. Which of the following is not a factor of 128?
(1) 8 (2) 2 (3) 3 (4) 4

8. Total number of the factors of 210 is
(1) 16 (2) 8 (3) 10 (4) 14

9. All prime factors of 150 are
(1) 2, 3, 5 (2) 3, 5, 10
(3) 2, 3, 5, 5 (4) None of these

10. Which one of the following is true?
(1) 1 is a factor of every number
(2) The factors of a number are uncountable
(3) The multiples of a number are countable
(4) 1 is a multiple of every number

11. The sum of first five even multiples of 2 is
(1) 28 (2) 32 (3) 40 (4) 30

12. The sum of first 8 multiple of 3 is
(1) 108 (2) 110 (3) 107 (4) 105

13. The numbers x, $x + 2$, $x + 4$ are all prime so x is
(1) 3 (2) 2
(3) 11 (4) 17

14. Which of the following is a prime factor?
(1) $84 = 2 \times 2 \times 3 \times 7$
(2) $112 = 2 \times 2 \times 14 \times 2$
(3) $70 = 14 \times 5$
(4) $45 = 5 \times 9$

15. Which of the following is a prime factor?
(1) $48 = 2 \times 2 \times 2 \times 6$ (2) $63 = 3 \times 3 \times 7$
(3) $81 = 3 \times 3 \times 9$ (4) $54 = 2 \times 3 \times 9$

16. Common multiple number for 18 and 54 is
(1) 8 (2) 9
(3) 7 (4) 4

17. The number x, $x-2$ and $x-6$ are all prime numbers, so find the value of x.
(1) 15 (2) 17 (3) 19 (4) 21

18. Common multiple for the numbers 4, 8 and 10, within the first 10 multiples is
(1) 40 (2) 20 (3) 50 (4) 48

19. Which of the following is not a prime factor?
(1) $81 = 3 \times 3 \times 3 \times 3$
(2) $102 = 2 \times 3 \times 17$
(3) $64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$
(4) $98 = 7 \times 14$

20. Which of the following is a prime factor of 168?
(1) $2 \times 2 \times 6 \times 7$ (2) $2 \times 4 \times 3 \times 7$
(3) $2 \times 2 \times 2 \times 21$ (4) $2 \times 2 \times 2 \times 3 \times 7$

21. Which of the following is always a factor of prime number?
(1) 1 (2) 2 (3) 4 (4) 7

22. Common multiple of numbers 6, 8 and 12, within the first 10 multiples are
(1) 24, 40 (2) 24, 48 (3) 40, 60 (4) 36, 40

23. The sum of first four multiple of 7 is
(1) 60 (2) 68 (3) 70 (4) 74

Answers

1. (2)	**2.** (2)	**3.** (4)	**4.** (4)	**5.** (2)	**6.** (3)	**7.** (3)	**8.** (1)	**9.** (3)	**10.** (1)
11. (4)	**12.** (1)	**13.** (1)	**14.** (1)	**15.** (2)	**16.** (2)	**17.** (3)	**18.** (1)	**19.** (4)	**20.** (4)
21. (1)	**22.** (2)	**23.** (3)							

Hints and Solutions

1. ∵ Factors of 81 are 1×81, 3×27 and 9×9
∴Number of factors = (1, 3, 9, 27, 81) = 5

2. ∵ Factors of 54 are 1×54, 2×27
3×18 and 6×9.
∴Number of factors = (1, 2, 3, 6, 9, 18, 27, 54)
= 8

3.

2	120
2	60
2	30
3	15
5	5
	1

∴Prime factors of $120 = 2 \times 2 \times 2 \times 3 \times 5$

4.

2	48
2	24
2	12
3	6
3	3
	1

∴Prime factors of $120 = 2 \times 2 \times 2 \times 2 \times 3$

5. Multiples of 5 less than 45
= 5, 10, 15, 20, 25, 30, 35, 40
Hence, required number of multiples is 8.

6. Factors of $144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 1$
So, 5 is not a factor of 144.

7. Factors 128
$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 1$
$= 2 \times 2 \times 2 \times 2 \times 2 \times 4 \times 1 = 2 \times 2 \times 2 \times 2 \times 8 \times 1$
So, 3 is not the factor of 128.

8. Factors of 210 are 1×210, 2×105
3×70, 5×42, 6×35, 7×30 and 10×21, 14×15
Number of factors = 1, 2, 3, 5, 6, 7, 10, 14, 15, 21, 30, 35, 42, 70, 105, 210
Hence, number of factor is 16.

9.

2	150
3	75
5	25
5	5
	1

Prime factors of 150 = 2, 3, 5, 5

10. 1 is a factor of every number.

11. ∵ First 5 even multiples of 2 = 2, 4, 6, 8, 10

Sum of these multiples = 2 + 4 + 6 + 8 + 10
= 30

12. ∵ First 8 multiple of 3 are 3, 6, 9, 12, 15, 18, 21 and 24.

∴Sum of these multiples
= 3 + 6 + 9 + 12 + 15 + 18 + 21 + 24 = 108

13. 3 (∵ $x = 3$, $x + 2 = 3 + 2 = 5$ and
$x + 4 = 3 + 4 = 7$)

14. Prime factors of 84 = 2 × 2 × 3 × 7

Prime factors of 112 = 2 × 2 × 2 × 2 × 2 × 7

Prime factor of 70 = 2 × 5 × 7

Prime factors of 45 = 3 × 3 × 5

So, factors of 84 are prime factors.

15. Prime factors of 48 = 2 × 2 × 2 × 2 × 3

Prime factors of 63 = 3 × 3 × 7

Prime factors of 81 = 3 × 3 × 3 × 3

Prime factors of 54 = 2 × 3 × 3 × 3

So, factors of 63 are prime factors.

16. Factors of 18 = 2 × 3 × 3

Factors of 54 = 2 × 3 × 3 × 3

∴Common multiple = 3 × 3 = 9

17. From option (3), $x = 19$,

$x - 2 = 19 - 2 = 17$

$x - 6 = 19 - 6 = 13$

18. First 10 multiples of 4 = 4, 8, 12, 16, 20, 24, 28, 32, 36, (40)

8 = 8, 16, 24, 32, (40), 48, 56, 64, 72, 80

10 = 10, 20, 30, (40), 50, 60, 70, 80, 90, 100

Hence, common multiple = 40

19. Prime factors of 81 = 3 × 3 × 3 × 3

Prime factors of 102 = 2 × 3 × 17

Prime factors of 64 = 2 × 2 × 2 × 2 × 2 × 2

Prime factors of 98 = 2 × 7 × 7

So, factor of 98 are not prime factors.

20. Prime factors of 168 = 2 × 2 × 2 × 3 × 7

21. 1 is the factor of prime number.

22. First 10 multiple of

6 = 6, 12, 18, (24), 30, 36, 42, (48), 54, 60

8 = 8, 16, (24), 32, 40, (48), 56, 64, 72, 80

12 = 12, (24), 36, (48), 60, 72, 84, 96, 108, 120

So, common multiples are 24 and 48.

23. First 4 multiples of 7 = 7, 14, 21, 28

Sum of these multiples = 7 + 14 + 21 + 28
= 70

Self Practice

1. Sum of first five odd multiples of 3 are
(1) 45 (2) 75 (3) 90 (4) 60

2. The number of multiples of 3 between 18 and 54
(1) 11 (2) 12 (3) 10 (4) 14

3. Sum of first five multiples of 6 are
(1) 90 (2) 30 (3) 60 (4) 120

4. The prime factors of 75 are
(1) $3\times5\times3$ (2) 3×25 (3) 5×15 (4) $3\times5\times5$

5. All prime factors of 182 are
(1) 2 and 13 (2) 2 and 7 (3) 2, 7 and 13 (4) None of these

6. The prime factors of 210 are
(1) 5 (2) 4 (3) 3 (4) 2

7. The prime factors of 2310 are
(1) 2, 3, 5, 7, 11 (2) 2, 3, 4, 7 (3) 2, 4, 6, 7, 11 (4) None of these

8. Prime factors of 240 are
(1) $2\times2\times4\times3\times5$ (2) $2\times2\times2\times2\times3\times5$ (3) $4\times4\times3\times5$ (4) $4\times4\times15$

9. Multiple of first three multiple of 4
(1) 380 (2) 384 (3) 390 (4) 400

10. The number of multiple of 7 between 21 and 77
(1) 6 (2) 7 (3) 8 (4) 9

11. Prime factors of 68 are
(1) 2×34 (2) $2\times2\times17$ (3) 4×17 (4) 1×68

12. Prime factors of 88 are
(1) 3 (2) 4 (3) 6 (4) 8

13. Common multile of number 7 and 17 within 5 multiple
(1) 14, 42 (2) 14, 30 (3) 14, 28 (4) 21, 56

14. Which of the following is true?
(1) Every number is a factor of itself
(2) Number of multiples of a number are infinite
(3) A number is exactly divisible by its factors
(4) All are true

15. Which of the following is not true?
(1) Every number is a multiple of itself
(2) 1 is not the factor of all numbers
(3) Exact divisor of a number is a factor of that number
(4) All are true

Answers

1. (2)	**2.** (1)	**3.** (1)	**4.** (4)	**5.** (3)	**6.** (2)	**7.** (1)	**8.** (2)	**9.** (2)	**10.** (2)
11. (2)	**12.** (2)	**13.** (3)	**14.** (4)	**15.** (2)					

CHAPTER

05

LCM AND HCF OF NUMBERS

LCM

LCM (Least Common Multiple) of two or more numbers is a number which is smallest common multiple of the numbers, *e.g.*, Multiple of 5 are 5, 10, 15, 20, 25, 30, 35, 40.

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

e.g. Among the multiple of 5 and 6; 30 is the smallest multiple, which is common to both.

So, 30 is LCM of 5 and 6.

Similarly, 28 is the LCM of 4 and 7.

Methods for Finding LCM

There are two methods for finding LCM

1. Prime factorisation method
2. Division method

Prime Factorisation Method

Step I Write each of the given numbers as product of prime factors.

Step II Find the product of the highest powers of the prime factors, which will be the LCM.

Example **1.** Find the LCM of 54 and 21.

(1) 350 (2) 256
(3) 378 (4) 415

Sol. **(3)** Prime factors of,

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

In both numbers, $21 = 3 \times 7$

Factor '2' appears maximum 'one' time.

Factor '3' appears maximum 'three' times.

Factor '7' appears maximum 'one' time.

$\therefore$ Product $= 2 \times 3 \times 3 \times 3 \times 7 = 378$,

which is the required LCM.

Division Method

Step I Write the given numbers in a row

Step II Write the factor on the left hand side, which can divide maximum of the numbers.

Step III Write down the quotients and the undivided numbers in the row below the first row.

Step IV Repeat steps II and III until we get a row, where all the numbers are prime to each other.

Step V The product of all the factors/divisors and the numbers left in the last row is the required LCM.

Example **2.** Find the LCM of 36, 56, 105 and 108.

(1) 6730 (2) 7577 (3) 6578 (4) 7560

Sol. **(4)**

2	36, 56, 105, 108
2	18, 28, 105, 54
3	9, 14, 105, 27
7	3, 14, 35, 9
	3, 2, 5, 9

36 is a factor/submultiple of 108 ($36 \times 3 = 108$). 56 and 108 are divisible by 2. So, we write 2 on the left side and perform Step III.

Next factors are 2, 3 and 7.

Thereafter, we find that 2, 5 and 9 left in the last row have no common divisor *i.e.*, 2, 5, 9 are co-prime to each other, though 9 itself is not a prime number.

So, we find the product of 2, 2, 3, 7, 2, 5 and 9 to get the required LCM. LCM $= 2 \times 2 \times 3 \times 7 \times 2 \times 5 \times 9 = 7560$

Questions Based on Bells

To solve the problems based on ringing bells at different intervals, the student has to take LCM of different intervals.

Example Six bells commence ringing together and ring at intervals of 2, 4, 6, 8, 10 and 12 seconds respectively. After what interval of time will they ring again together?

Sol. According to question, first we take the LCM of intervals

LCM of 2, 4, 6, 8, 10 and 12.

So, after each 120 seconds, they would ring together.

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

$\Rightarrow \quad 2\times2\times2\times3\times5=120$

HCF

HCF (Highest Common Factor) is the greatest number that divides both the given numbers or more numbers. i.e., HCF is a greatest common factor of all the given numbers.

It is also known as Greatest Common Divisor (GCD).

e.g. 15 is the greatest number that divides both 30 and 75. So, 15 is the HCF of 30 and 75.

Methods for Finding HCF

There are two methods for finding HCF

1. Prime factorisation method
2. Division method

Prime Factorisation Method

Step I Write each number as product of its prime factors.

Step II Multiply the factors with lowest powers which are common to all numbers.

Example **3.** Find the HCF of 140, 168 and 224.

(1) 25 (2) 28
(3) 38 (4) 20

Sol. **(2)** Factorising the given numbers

2	140
2	70
5	35
	7

2	168
2	84
2	42
3	21
	7

2	224
2	112
2	56
2	28
2	14
	7

Thus, $140 = 2\times2\times5\times7$

$168 = 2\times2\times2\times3\times7$

$224 = 2\times2\times2\times2\times2\times7$

Common prime factors are $2\times2\times7$

$\therefore$ HCF $= 2\times2\times7 = 28$

Division Method

Step I Divide the greater number by the smaller number.

Step II Next, divide the preceding divisor by the remainder. Continue until you get zero as remainder. The last divisor is the required HCF.

Example **4.** Find the HCF of 45 and 108.

(1) 12 (2) 7 (3) 9 (4) 10

Sol. **(3)** $\because$ $45 < 108$

$\therefore$ 45) 108 (2
90
18) 45 (2
36
9) 18 (2
18
×

$\therefore$ Required HCF = 9

Example **5.** Find the HCF of 24 and 30.

(1) 6 (2) 7 (3) 8 (4) 5

Sol. **(1)** By prime factorization method,

$24 = 2\times2\times2\times3; 30 = 2\times3\times5$

HCF = Highest Common Factor of 24 and 30

$= 2\times3 = 6$

Alternate Method

By Division method,

24)30(1
24
6)24(4
24
×

$\therefore$ HCF = The last divisor = 6

Entrance Corner

1. The number of numbers which are multiples of both 3 and 5 in the first 100 natural numbers is [JNV 2019]
(1) 10 (2) 9 (3) 7 (4) 6

2. The HCF of two numbers 14 and 28 is 14. Find the LCM. [JNV 2018]
(1) 28 (2) 196 (3) 298 (4) 98

3. What is the four digit smallest number which is completely divided by 2,3,8,10? [JNV 2019]
(1) 1020 (2) 1060 (3) 1080 (4) 1120

4. The HCF of two numbers is 38 and their LCM is 98154. If one of the number is 1558. The other number is [JNV 2017, 2009]
(1) 1197 (2) 2394 (3) 4932 (4) 2384

5. HCF of 128, 288 and 160 is [JNV 2016]
(1) 16 (2) 24 (3) 32 (4) 48

6. If the product of two co-prime numbers is 117, their LCM will be [JNV 2016]
(1) 9 (2) 13 (3) 39 (4) 117

7. The greatest number which will divide 1277 and 1368 leaving 3 as the remainder in each case is [JNV 2015]
(1) 68 (2) 77 (3) 91 (4) 97

8. LCM of 114 and 95 is [JNV 2015]
(1) 570 (2) 950 (3) 1140 (4) 5700

9. Three bells ring at intervals of 12, 15 and 18 min, respectively. They started ringing simultaneously at 9 : 00 am. What will be the next time when they all ring simultaneously? [JNV 2014]
(1) 10 : 00 am (2) 11 : 00 am
(3) 12 : 00 pm (4) 1 : 00 pm

10. Greatest number, which is to be divided by 280 and 1245 leaves the remainder 4 and 3 respectively, is [JNV 2014]
(1) 138 (2) 148 (3) 145 (4) 178

11. Find the HCF of 45, 75 and 165. [JNV 2013]
(1) 15 (2) 45 (3) 75 (4) 2475

12. Find the smallest number divided by 42, 98 and 70. [JNV 2013]
(1) 1470 (2) 1740 (3) 1070 (4) 980

13. Find the LCM of 12,18 and 24. [JNV 2012]
(1) 72 (2) 48 (3) 60 (4) 84

14. LCM of 42, 70, 98 and 126 is [JNV 2011]
(1) 126 (2) 2205 (3) 4410 (4) 8820

15. Find the common factor of 12 and 15. [JNV 2010]
(1) 1, 2, 4 (2) 1, 3, 5 (3) 1, 12 (4) 1, 3

16. What is the greatest number that divides both 16 and 20 exactly? [JNV 2008]
(1) 40 (2) 32 (3) 80 (4) 4

17. Find the least number which is divisible by 15 and 18. [JNV 2008]
(1) 60 (2) 54 (3) 90 (4) 100

18. Find the LCM of 30, 40 and 60. [JNV 2008]
(1) 300 (2) 120 (3) 180 (4) 500

19. What will be the HCF of 48, 144 and 576? [JNV 2007]
(1) 576 (2) 144 (3) 48 (4) 1

20. What is the LCM of 16, 80 and 48? [JNV 2005]
(1) 8 (2) 16 (3) 240 (4) 480

21. The difference between the LCM and HCF of the numbers 30, 36 and 90 is [JNV 2004]
(1) 366 (2) 354 (3) 186 (4) 174

22. Three bells start ringing together at 8 : 35 am, if they ring after 12 s, 15 s and 18 s respectively each time, the next time they will ring together at [JNV 2004]
(1) 8 : 38 am (2) 8 : 40 am
(3) 8 : 41 am (4) 8 : 45 am

23. The LCM of 8, 12, 20 and 36 is [JNV 2003]
(1) 120 (2) 180 (3) 360 (4) 720

24. The HCF of two co-prime numbers is [JNV 2003]
(1) 1
(2) 0
(3) sum of the numbers
(4) difference of the numbers

25. Three bells start ringing together at 8 : 30 am. If they ring after 4 min, 5 min and 6 min respectively each time, the next time they will ring together at [JNV 2003]
(1) 8 : 45 am (2) 9 : 30 am
(3) 9 : 45 am (4) 10 : 15 am

26. The LCM of 12, 24 and 30 is [JNV 2002]
(1) 2 (2) 30 (3) 60 (4) 120

27. LCM of 3, 5 and 9 is [JNV 2000]
(1) 25 (2) 45 (3) 65 (4) 85

28. HCF of 8, 18, 24 is [JNV 2000]
(1) 2 (2) 4
(3) 6 (4) 8

29. Six bells begin tolling together and toll at interval of 2 s, 4 s, 6 s, 8 s, 10 s, 12 s, respectively. The time after which they will toll together is [JNV 1999]
(1) 2 min (2) 103 s
(3) 150 s (4) 1 min

30. Find the greatest number which divides 18 and 30 completely. [JNV 1999]
(1) 6 (2) 8
(3) 10 (4) 12

31. The greatest number which will divide 2112 and 2792 leaving 4 as the remainder in each case is [JNV 1999]
(1) 68 (2) 58 (3) 78 (4) 188

32. Find the LCM of 18, 24 and 60. [JNV 1999]
(1) 120 (2) 360
(3) 480 (4) 520

33. Find the HCF of 84 and 105. [JNV 1998]
(1) 19 (2) 20 (3) 21 (4) 22

34. Find the LCM of 20, 40, 60 is [JNV 1997]
(1) 100 (2) 120 (3) 140 (4) 240

35. Find the measure of the greatest length which can measure 24 m, 32 m and 44 m completely. [JNV 1997]
(1) 2 m (2) 3 m (3) 4 m (4) 5 m

Answers

1. (4)	**2.** (1)	**3.** (3)	**4.** (2)	**5.** (3)	**6.** (4)	**7.** (3)	**8.** (1)	**9.** (3)	**10.** (1)
11. (1)	**12.** (1)	**13.** (1)	**14.** (3)	**15.** (4)	**16.** (4)	**17.** (3)	**18.** (2)	**19.** (3)	**20.** (3)
21. (4)	**22.** (1)	**23.** (3)	**24.** (1)	**25.** (2)	**26.** (4)	**27.** (2)	**28.** (1)	**29.** (1)	**30.** (1)
31. (1)	**32.** (2)	**33.** (3)	**34.** (2)	**35.** (3)					

Hints and Solutions

1. ∵ LCM of 3 and 5 = 15
The numbers which are multiples of both 3 and 5
$= 15\times1,\ 15\times2,\ 15\times3,\ 15\times4,\ 15\times5,\ 15\times6$
$= 15, 30, 45, 60, 75, 90$
Total numbers = 6

2. We know that,
Product of two numbers = HCF × LCM
$$14\times28 = 14\times \text{LCM} \Rightarrow \text{LCM} = \frac{14\times28}{14} = 28$$

3. LCM of 2,3,8,10

2	2, 3, 8, 10
3	1, 3, 4, 5
4	1, 1, 4, 5
5	1, 1, 1, 5
	1, 1, 1, 1

$= 2\times3\times4\times5 = 120$
∴The four digit smallest number is multiple of
$120 = 120\times9 = 1080$

4. Other number $= \frac{\text{HCF}\times\text{LCM}}{\text{First number}}$
$$= \frac{38\times98154}{1558}$$
$= 2394$

5. $128 = 2\times2\times2\times2\times2\times2\times2$
$288 = 2\times2\times2\times2\times2\times3\times3$
$160 = 2\times2\times2\times2\times2\times5$
So, the required HCF = Common factor between given numbers
$= 2\times2\times2\times2\times2 = 32$

6. ∵ $117 = 3\times3\times13$
Here, 9 and 13 are co-prime, so the required LCM $= 9\times13 = 117$

7. Required greatest number
= HCF of (1277 − 3) and (1368 − 3)
= HCF of 1274 and 1365

1274)1365(1 and 91)1365(15
1274 1365
91)1274(14 ×
1274
×

∴ Greatest number = 91

8.

2	114, 95
3	57, 95
19	19, 95
5	1, 5
	1, 1

∴ Required LCM = 2 × 3 × 19 × 5 = 570

9. The LCM of 12, 15 and 18
⇒ 2 × 2 × 3 × 5 × 3 = 180
Here, 60 min = 1 h; 180 min = 3 h
Hence, bells would rung after 3 h at 12:00 pm.

10. Required HCF = (280 − 4) and (1245 − 3)
= 276 and 1242

276) 1242 (4
1104
138) 276 (2
276
×

∴ Required greatest number = 138

11. HCF of 45, 75 and 165

45) 75 (1 15) 165 (1
45 15
30) 45 (1 15)15(1
30 15
15) 30 (2 ×
30
×

∴ HCF = 15

12. Required smallest number = LCM of 42, 98 and 70

2	42, 98 ,70
7	21, 49, 35
3	3, 7, 5
5	1, 7, 5
7	1, 7, 1
	1, 1, 1

∴ Required number = 2 × 7 × 3 × 5 × 7 = 1470

13.

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

LCM of 12, 18 and 24 = 2 × 2 × 2 × 3 × 3
= 72

14.

2	42, 70, 98, 126
3	21, 35, 49, 63
7	7, 35, 49, 21
	1, 5, 7, 3,

∴ LCM = 2 × 3 × 7 × 5 × 7 × 3 = 4410

15. 12 = 1 × 2 × 2 × 3;
15 = 1 × 3 × 5
∴ Common factor = 1, 3

16. 16) 20 (1
16
4) 16 (4
16
×
So, 4 is the greatest number.

17. LCM of 15 and 18

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

∴ Required number = 2 × 3 × 3 × 5
= 90

18.

2	30, 40, 60
2	15, 20, 30
3	15, 10, 15
5	5, 10, 5
	1, 2, 1

∴ Required LCM = 2 × 2 × 3 × 5 × 2 = 120

19. 48) 144 (3
144
×
Again, 48) 576 (12
48
96
96
×
∴ HCF = 48

20. LCM of 16, 80 and 48

2	16, 80, 48
2	8, 40, 24
2	4, 20, 12
2	2, 10, 6
	1, 5, 3

$\therefore$ LCM $= 2\times2\times2\times2\times5\times3 = 16\times15 = 240$

21.

2	30, 36, 90
2	15, 18, 45
3	15, 9, 45
3	5, 3, 15
5	5, 1, 5
	1, 1, 1

$\therefore$ LCM $= 2\times2\times3\times3\times5 = 180$

36) 90 (2
72
18) 36 (2
36
×
18) 30 (1
18
12) 18 (1
12
6) 12 (2
12
× HCF = 6

$\therefore$ Difference $= 180 - 6 = 174$

22.

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

LCM $= 2\times3\times2\times5\times3 = 180$ s or 3 min

After 3 min the bells will toll together

i.e. 8:35 + 3min = 8:38 am

23.

2	8, 12, 20, 36
2	4, 6, 10, 18
3	2, 3, 5, 9
	2, 1, 5, 3

LCM $= 2\times2\times3\times2\times5\times3 = 360$

24. The HCF of two co-prime number is always 1.

25. The LCM of 4, 5 and 6 = 60

Hence, after 60 min *i.e.*, after 1 h.

They will ring together *i.e.*, at 9 : 30 am.

26.

2	12, 24, 30
2	6, 12, 15
3	3, 6, 15
	1, 2, 5

$\therefore$ LCM $= 2\times2\times3\times2\times5 = 120$

27.

3	3, 5, 9
	1, 5, 3

$\therefore$ LCM $= 3\times5\times3 = 45$

28. 8) 18 (2
16
2) 8 (4
8
×
2) 24 (12
24
×

$\therefore$ Required HCF = 2

29.

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

$\therefore$ Required time $= 2\times2\times3\times2\times5 = 120$ s
$= 2$ min

30. 18) 30 (1
18
12) 18 (1
12
6) 12 (2
12
×

The greatest number is 6.

31. $2112 - 4 = 2108$

$2792 - 4 = 2788$

2108) 2788 (1
2108
680) 2108 (3
2040
68) 680 (10
680
×

Hence, the required greatest number is 68.

32.

2	18, 24, 60
2	9, 12, 30
3	9, 6, 15
	3, 2, 5

$\therefore$ LCM $= 2\times2\times3\times3\times2\times5 = 360$

33. 84) 105 (1
84
21) 84 (4
84
×
∴ HCF = 21

34.

2	20, 40, 60
2	10, 20, 30
5	5, 10, 15
	1, 2, 3

∴ LCM = 2 × 2 × 5 × 2 × 3 = 120

35. 24) 32 (1
24
8) 24 (3
24
×
8) 44 (5
40
4) 8 (2
8
×
Hence, the greatest measure is 4 m.

Practice Exercise

1. LCM of 2 × 3 × 5 and 3 × 5 × 7 is equal to
(1) 3 (2) 3 × 5
(3) 2 × 3 × 5 × 7 (4) 2 × 3 × 5 × 3 × 5 × 7

2. What is the number, which when divided by 8, 12 and 15, leaves a remainder 3 in each case?
(1) 63 (2) 66 (3) 123 (4) 183

3. Which of the following smallest four digit number divisible by 2, 3, 4, 5, 6 and 7?
(1) 1260 (2) 420
(3) 840 (4) 2100

4. Find the LCM of 8,14 and 26.
(1) 728 (2)782 (3) 872 (4) 278

5. Find the LCM of 2 × 3 × 5 × 7 and 3 × 5 × 7 × 11.
(1) $2 \times 3 \times 5 \times 7 \times 11$ (2) $2 \times 3^2 \times 5^2 \times 7^2 \times 11$
(3) $3 \times 5 \times 7$ (4) None of these

6. Vishal, Monu and Puneet start running around a circular ground and complete one round in 24 s, 6 s and 14 s respectively, in how much time will they meet again at the starting point?
(1) 1 min 32 s (2) 4 min 8 s
(3) 3 min 25 s (4) 2 min 48 s

7. Hemu, Anshul and Gaurav start running around a circular stadium and complete one round in 27s, 9s, and 36s, respectively. In how much time will they meet again at starting point?
(1) 2 min 36 s (2) 2 min 25 s
(3) 3 min 11 s (4) 1 min 48 s

8. Three bells ring at intervals of 15 s, 21s and 16 s, respectively. All bells ring simultaneously at 12: 00 noon. They will again ring simultaneously at
(1) 28 min past 12
(2) 25 min past 12
(3) 26 min past 12
(4) 24 min past 12

9. Three bells ring at intervals of 12 s, 9 s and 24 s, respectively. All bells ring simultaneously at 3: 00 pm. They will again ring simultaneously after
(1) 2 min 36 s (2) 2 min 12 s
(3) 1 min 12 s (4) 1 min 24 s

10. Raghav, Arun and Rinku joggning around a rectangular park and complete one round in 24 s, 18 s and 10 s, respectively. In how much time will they meet again at strating point?
(1) 5 min (2) 6 min
(3) 5 min 38 s (4) 6 min 14 s

11. Find the LCM of 12, 30, 60 is
(1) 20 (2) 30 (3) 60 (4) 80

12. The greatest number less than 1500, which is divisible by both 16 and 18, is
(1) 1440 (2) 1404 (3) 1386 (4) 1368

13. HCF of 5 × 7 × 9 × 11 × 13 and 9 × 11 × 13 × 17 is equal to
(1) 13
(2) 33
(3) 9 × 11 × 13
(4) 5 × 7 × 9 × 11 × 13 × 17

14. The HCF and LCM of two numbers are 4 and 48, respectively. If one of these number is 12, then the other number is
(1) 16 (2) 12
(3) 8 (4) 4

15. The LCM and HCF of two numbers are 96 and 8, respectively. One number is 32, then the other number is
(1) 256 (2) 24
(3) 12 (4) 768

16. The LCM and HCF of two numbers are 180 and 3, respectively. If one of the two numbers be 45, then the other number is
(1) 12 (2) 60
(3) 135 (4) 540

17. The product of two numbers is 216 and their HCF is 3, then their LCM is
(1) 648 (2) 219 (3) 213 (4) 72

18. HCF of two numbers is 20 and their LCM is 120. If one number is 60 find the other.
(1) 40 (2) 50 (3) 30 (4) 60

19. Find the HCF of 15, 30, 45 is
(1) 10 (2) 15 (3) 20 (4) 25

20. Find the greatest number which divides 36 and 48 completely.
(1) 10 (2) 11 (3) 12 (4) 13

21. Two numbers are in the ratio 3 : 4 and the product of their LCM and HCF is 10800. Find the sum of the numbers.
(1) 190 (2) 70
(3) 210 (4) 200

22. The LCM of two numbers is 1820 and their HCF is 26. If one number is 130, then the other number is
(1) 70 (2) 1690
(3) 364 (4) 1264

Answers

1. (3)	**2.** (3)	**3.** (1)	**4.** (1)	**5.** (1)	**6.** (4)	**7.** (4)	**8.** (1)	**9.** (3)	**10.** (2)
11. (3)	**12.** (1)	**13.** (3)	**14.** (1)	**15.** (2)	**16.** (1)	**17.** (4)	**18.** (1)	**19.** (2)	**20.** (3)
21. (3)	**22.** (3)								

Hints and Solutions

1. LCM of $2 \times 3 \times 5$
and $3 \times 5 \times 7 = 2 \times 3 \times 5 \times 7$.

2.

2	8, 12, 15
2	4, 6, 15
3	2, 3, 15
	2, 1, 5

$\therefore$ LCM $= 2 \times 2 \times 3 \times 2 \times 5 = 120$
$\therefore$ To get remainder 3 in each case, the required number $= 120 + 3 = 123$.

3.

2	2, 3, 4, 5, 6, 7
3	1, 3, 2, 5, 3, 7
	1, 1, 2, 5, 1, 7

$\therefore$ LCM $= 2 \times 3 \times 2 \times 5 \times 7 = 420$
Now, smallest number of four digit, which is divisible by 2, 3, 4, 5, 6 and 7 is the multiple of 420.
$\therefore$ $420 \times 3 = 1260$ is the required number.

4.

2	8, 14, 26
2	4, 7, 13
2	2, 7, 13
7	1, 7, 13
13	1, 1, 13
	1, 1, 1

Hence, required LCM $= 2 \times 2 \times 2 \times 7 \times 13 = 728$

5. First number $= 2 \times 3 \times 5 \times 7$
Second number $= 3 \times 5 \times 7 \times 11$
$\therefore$ LCM $= 2 \times 3 \times 5 \times 7 \times 11$

6. Required time to meet again
= LCM of 24, 6 and 14
Now, $24 = 2 \times 2 \times 2 \times 3$
$6 = 2 \times 3$; $14 = 2 \times 7$
$\therefore$ LCM $= 2 \times 2 \times 2 \times 3 \times 7 = 168$ s
$= 2$ min 48s
Clearly, they will meet again afte 2 min 48 s.

7. Required time to meet again = LCM of 27,9 and 36

Now, $27 = 3\times3\times3$

$9 = 3\times3$

$36 = 2\times2\times3\times3$

$\therefore$ LCM $= 3\times3\times3\times2\times2$

$= 108$ s $= 1$ min 48 s

Clearly, they will meet again 1 min 48 s.

8. Required time to ring again = LCM of 15, 21 and 16

Now, $15 = 3\times5$; $21 = 3\times7$

$16 = 2\times2\times2\times2$

$\therefore$ LCM $= 3\times5\times7\times2\times2\times2\times2$

$= 1680$ s $= 28$ min

Clearly, all the bell will ring at 28 min past 12.

9. Required time to ring again = LCM of 12, 9 and 24

Now, $12 = 2\times2\times3$

$9 = 3\times3$

$24 = 2\times2\times2\times3$

$\therefore$ LCM $= 2\times2\times2\times3\times3 = 72$ s

$= 1$ min 12 s

Clearly, all the bell will ring after 1 min 12 s.

10. Required time to meet again = LCM of 24,18 and 10

Now, $24 = 2\times2\times2\times3$

$18 = 2\times3\times3$

$10 = 2\times5$

$\therefore$ LCM $= 2\times2\times2\times3\times3\times5 = 360$ s $= 6$ min

Clearly, they will meet again after 6 min.

11.

2	12, 30, 60
2	6, 15, 30
3	3, 15, 15
5	1, 5, 5
	1, 1, 1

$\therefore$ LCM $= 2\times2\times3\times5 = 60$

12. LCM of 16 and 18

2	16, 18,
8	8, 9,
9	1, 9,
	1, 1,

$= 2\times8\times9 = 144$

On dividing 1500 by 144, then the remainder is 60.

Hence, required number $= 1500 - 60 = 1440$

13. HCF of $5\times7\times9\times11\times13$ and $9\times11\times13\times17$.

The common factors $= 9\times11\times13$

14. $\because$ Other number $= \dfrac{\text{HCF}\times\text{LCM}}{\text{First number}}$

$= \dfrac{4\times48}{12} = 16$

15. The other number is

$= \dfrac{\text{HCF}\times\text{LCM}}{\text{First number}}$

$= \dfrac{96\times8}{32} = 24$

16. Other number $= \dfrac{\text{LCM}\times\text{HCF}}{\text{First number}}$

$= \dfrac{180\times3}{45} = 12$

17. LCM $= \dfrac{\text{Product of two numbers}}{\text{HCF}}$

$= \dfrac{216}{3} = 72$

18. Other number $= \dfrac{20\times120}{60} = 40$

19.

15) 30 (2
30
×

15) 45 (3
45
×

$\therefore$ HCF $= 15$

20.

36) 48 (1
36

12) 36 (3
36
×

$\therefore$ Greatest number is 12 .

21. Let the numbers be $3x$ and $4x$ respectively.

Then, their HCF $= x$ and their LCM $= 12x$

$\therefore 12x \times x = 10800$ or $x^2 = 900$ or $x = 30$

So, the numbers are 90 and 120.

The sum of the numbers $= 210$

22. One of the numbers is 130.

$\therefore$ Other number $= \dfrac{1820\times26}{130} = 364$

Self Practice

1. HCF of 160, 165 and 305 is
(1) 5 (2) 10 (3) 15 (4) 20

2. LCM of 28, 35, 56, 84 is
(1) 84 (2) 252 (3) 840 (4) 420

3. HCF of 48, 144 and 576 is
(1) 576 (2) 144 (3) 48 (4) 1

4. The least number such that, when it divided by 15, 25, 35 and 45, it leaves remainder 7, 17, 27 and 37 respectively, is
(1) 1575 (2) 1557 (3) 1576 (4) 1567

5. The LCM of $2^3 \times 3 \times 5$ and $2^4 \times 5 \times 7$ is
(1) 1680 (2) 840 (3) 210 (4) 630

6. The HCF of two numbers is 38 and their LCM is 98154. If one of the number is 1558. The other number is
(1) 1197 (2) 2394 (3) 4932 (4) 2384

7. The greatest number that will divide 1375 and 4935 exactly is
(1) 5 (2) 1375 (3) 15 (4) 4935

8. The product of two numbers is 23625 and LCM is 315. The HCF of the number is
(1) 315 (2) 23625 (3) 75 (4) 15

9. The least number which is divided by 12, 15, 20 and 25 exactly, is
(1) 150 (2) 200 (3) 600 (4) 300

10. The greatest 4 digit number, such that when it divided by 15, 18, 21 and 24, it leaves remainder 5 in each case is
(1) 7565 (2) 7556 (3) 5756 (4) 6575

11. Five bells beginning together toll at interval 4s, 5s, 7s, 8s and 10s, respectively. After what interval of time will they toll again together?
(1) 2 m 20 s (2) 4 m 40 s (3) 6 m 40 s (4) 2 m 40 s

12. The LCM of two numbers is p and their HCF is q. The product of the two numbers is
(1) pq (2) p / q (3) q/p (4) None of these

13. The smallest 4 digit number such that, when it is divided by 12, 18, 21 and 28, it leaves remainder 3 in each case is
(1) 1008 (2) 1003 (3) 1011 (4) 1014

Answers

1. (1)	**2.** (3)	**3.** (3)	**4.** (4)	**5.** (1)	**6.** (2)	**7.** (1)	**8.** (3)	**9.** (4)	**10.** (1)
11. (2)	**12.** (1)	**13.** (3)							

CHAPTER

06

DECIMAL AND FUNDAMENTAL OPERATIONS ON THEM

Decimal Numbers

The numbers expressed in decimal form are called decimal numbers e.g. 0.71, 3.2, 0.10

A decimal has two parts, namely

(i) whole number part (ii) decimal part

These parts are separated by a dot (.) called the decimal point.

The part on the left side of the decimal point is the whole number part and that on its right side is the decimal part. e.g. In 62.64, whole number part = 62 and decimal part = 64.

Decimal Places The number of digits contained in the decimal part of a decimal gives the number of decimal places. e.g. 4.24 has two decimal places and 9.126 has three decimal places.

Decimal Fraction

A fraction in which the denominator is 10 or the power of 10 called decimal fraction. It may be represented as $\frac{1}{10}, \frac{3}{100}, \frac{6}{1000}$ etc. Hence, $\frac{3}{100}$ is the hundredth part of 3 and must be written as 0.03.

Thus every decimal fraction represents a fraction number.

Table for Decimal Place Value

Thousand	Hundred	Ten	Ones	Tenth	Hundredth	Thousandth
1000	100	0	1	$\left(\frac{1}{10}\right) = 0.1$	$\left(\frac{1}{100}\right) = 0.01$	$\left(\frac{1}{1000}\right) = 0.001$

Operations on Decimal Numbers (or Fractions)

1. Addition and Subtraction of Decimal Numbers

To add or subtract decimal numbers, the numbers are placed under each in such a way that the decimal point lie in a line. Then, the numbers can be added or subtracted as in usual manner.

e.g. Find the addition of 51.3, 7.078, 1.38 and 0.9.

Now,

$$\begin{array}{r} 51.300 \\ 7.078 \\ 1.380 \\ +\ 0.900 \\ \hline 60.658 \end{array}$$

Example **1.** Find the addition of $9 + 2.42 + 4.067 + 16.89$.

(1) 32.737 (2) 32.377 (3) 32.773 (4) 32.320

Sol. **(2)**

$$\begin{array}{r} 9.000 \\ 2.420 \\ 4.067 \\ +16.890 \\ \hline 32.377 \end{array}$$

Example **2.** Subtract $27.85 - 14.34$.

(1) 12.51 (2) 11.13 (3) 13.51 (4) 13.71

Sol. **(3)**

$$\begin{array}{r} 27.85 \\ -14.34 \\ \hline 13.51 \end{array}$$

2. Multiplication of Two or More Decimal Numbers

To multiply two decimal numbers, we follow the given steps:

Step I Multiply the two decimal numbers without the decimal point just like whole numbers.

Step II Now, count the number of digits starting from the rightmost digit and move towards left. Then, put the decimal there. Mark the decimal point in the product in such a way that the number of decimal places in the product is equal to the sum of the decimal places in the given decimal numbers.

To multiply a decimal number by 10 is equivalent to moving the decimal point one place to the right. To multiply by 100 is equivalent to moving the decimal point two places to the right and so on.

Example **3.** Find the product of 3.5413×2.1.

(1) 7.67343 (2) 7.14654 (3) 6.67345 (4) 7.43673

Sol. **(4)** For the product of 3.5413×2.1

Consider them without decimal,

i.e., $35413 \times 21 = 743673$

Total number of digits after decimal $= 4 + 1 = 5$

So, put decimal point at 5th place from right hand side in product.

$\therefore\ 3.5413 \times 2.1 = 7.43673$

3. Division of Decimal Numbers

To divide a decimal number by another decimal number, remove the decimal point in the divisor by multiplying both the dividend and divisor by the appropriate multiple of 10, then use the procedure of dividing a decimal number by a whole number.

e.g. $7.103 \div 2.01 = \frac{7.103}{2.01} = \frac{7.103 \times 100}{2.01 \times 100} = \frac{710.3}{201} = 3.53$

Example **4.** Divide 1.562 by 0.25.

(1) 6.248 (2) 6.240 (3) 5.284 (4) 6.482

Sol. **(1)** $\frac{1.562}{0.25} = \frac{1.562 \times 100}{0.25 \times 100} = \frac{156.2}{25}$

Now,

$$\begin{array}{r} 6.248 \\ 25)\ 156.200 \\ \underline{150} \\ 62 \\ \underline{50} \\ 120 \\ \underline{100} \\ 200 \\ \underline{200} \\ \times \end{array}$$

$\therefore$ The quotient is 6.248.

4. Conversion of Simple Fraction into Decimal Number

To convert a fraction into a decimal, given steps are to be followed:

Step I Divide the numerator by the denominator till a non-zero remainder is obtained.

Step II Put a decimal point in the dividend as well as in the quotient.

Step III Put a zero on the right of the decimal point in the dividend as well as on the right of the remainder.

Step IV Divide again just as we do in wholenumbers.

Step V Repeat steps III and IV, till the remainder is zero.

Example **5.** Convert $\frac{11}{16}$ into decimal number.

(1) 0.6875 (2) 0.6785 (3) 0.6587 (4) 0.5687

Sol. **(1)**

$$\begin{array}{r} 0.6875 \\ 16)\ 11.0000 \\ \underline{96} \\ 140 \\ \underline{128} \\ 120 \\ \underline{112} \\ 80 \\ \underline{80} \\ \times \end{array}$$

$\therefore\ \frac{11}{16} = 0.6875$

5. Conversion of Decimal Number into Simple Fraction

To convert a decimal into a fraction, given steps are to be followed:

Step I Write the given decimal without decimalpoint as the numerator of the fraction.

Step II In the denominator, write 1 followed by as many zeroes as there are decimal places in the given decimal.

Step III Change the fraction obtained to the simplest form.

e.g., $0.025 = \frac{25}{1000}$

[$\because$ 3 digits after decimal, so we put 3 zeros]

Some Important Decimal Conversion

$\frac{1}{10} = 0.1$	$\frac{1}{9} = 0.\overline{1}$	$\frac{1}{12} = 0.08\overline{3}$	$\frac{1}{8} = 0.125$
$\frac{1}{15} = 0.06$	$\frac{1}{6} = 0.1\overline{6}$	$\frac{1}{16} = 0.0625$	$\frac{1}{5} = 0.2$
$\frac{1}{20} = 0.05$	$\frac{1}{4} = 0.25$	$\frac{1}{25} = 0.04$	$\frac{1}{3} = 0.\overline{3}$
$\frac{1}{40} = 0.025$	$\frac{1}{2} = 0.5$	$\frac{1}{50} = 0.02$	$\frac{3}{4} = 0.75$
$\frac{1}{100} = 0.01$	$\frac{2}{3} = 0.\overline{6}$	$\frac{2}{5} = 0.4$	$\frac{3}{2} = 1.5$
$\frac{5}{8} = 0.625$	$\frac{7}{8} = 0.875$	$\frac{3}{5} = 0.6$	$\frac{9}{11} = 0.\overline{81}$

Entrance Corner

1. Simplification of $2.75 - 1.25 + 4.75 - 3.80$ in fractional form is [JNV 2019]

(1) $2\frac{9}{20}$ (2) $2\frac{9}{10}$

(3) $1\frac{9}{10}$ (4) $5\frac{9}{20}$

2. Find the value of $3 \times 0.3 \times 0.003 \times 0 \times 30$. [JNV 2018]

(1) 81 (2) 8.1

(3) 0.81 (4) 0

3. If $23200 \div 145 = 160$, then $23.2 \div 1.45$ is equal to [JNV 2018]

(1) 160 (2) 16 (3) 1.60 (4) 0.16

4. Find the sum of $7.7 + 7.77 + 7.7777 + 7.777$. [JNV 2018]

(1) 28.2828 (2) 28.2847 (3) 30.0247 (4) 31.0247

5. The product of two decimals is 20.7326. If one decimal is 4.13, what is the other decimal? [JNV 2017]

(1) 5.12 (2) 4.82 (3) 5.23 (4) 5.02

6. If $4.75 \times 0.7 = 3.325$, then 475×0.7 is equal to [JNV 2016]

(1) 332.5 (2) 33.25 (3) 3.325 (4) 0

7. If $4854.3 \div 3.3 = 1471$, then $48.543 \div 33$ is equal to [JNV 2016]

(1) 1.471 (2) 14.71 (3) 147.1 (4) 0.1471

8. Ram bought a book for ₹ 178.50, some medicines for ₹ 248.25 and gave a ₹ 500 note to the shopkeeper. The remaining amount is [JNV 2016]

(1) ₹ 126.50 (2) ₹ 70.50 (3) ₹ 75.50 (4) ₹ 73.25

9. The decimal equivalent to $\left[\frac{3}{4} + \frac{4}{5} + \frac{8}{25}\right]$ is [JNV 2015]

(1) 1.870 (2) 18.70

(3) 187 (4) 1870

10. If $3.65 \times 0.5 = 1.825$, then the value of 365×0.5 is [JNV 2015]

(1) 182.5 (2) 18.25

(3) 1.825 (4) 365

11. $\frac{0.1}{0.01} + \frac{0.01}{0.1}$ is equals to [JNV 2014]

(1) $\frac{101}{10}$ (2) $\frac{1101}{100}$

(3) $\frac{11}{10}$ (4) $\frac{1001}{100}$

12. 00.0675 is divided by 15, quotient is [JNV 2014]

(1) 0.0045 (2) 0.0450

(3) 0.0450 (4) 0.6045

13. Which of the following is equivalent to 1.01? [JNV 2014]

(1) 101% (2) 10.1%

(3) 1.01% (4) 1010%

14. If $4015 \div 11 = 365$, $40.15 \div 1.1$ is equal to [JNV 2014]

(1) 36.5 (2) 3.65 (3) 0.365 (4) 0.0365

15. $17\frac{1}{16}$ decimal equivalent as [JNV 2013]

(1) 17.625 (2) 17.6025
(3) 17.0625 (4) 17.0525

16. Which number divided by 5.029 to obtain 50.29? [JNV 2013]

(1) 0.01 (2) 0.1
(3) 1.0 (4) 10.0

17. The sum of 7.7, 7.07, 7.007 and 77.0077 is [JNV 2013]

(1) 98.7777 (2) 98.7877
(3) 98.7807 (4) 98.7847

18. What is the decimal equivalent of (₹ 2200 of 4%) of 7.5 %? [JNV 2013]

(1) ₹ 13.2 (2) ₹ 6.6 (3) ₹ 3.3 (4) ₹ 26.4

19. What fraction of ₹ 4 is ₹ 1.50? [JNV 2012]

(1) $\frac{1}{8}$ (2) $\frac{3}{8}$ (3) $\frac{1}{4}$ (4) $\frac{2}{5}$

20. $\frac{61}{10000}$ can be changed into decimal as [JNV 2010]

(1) 610000 (2) 0.61000
(3) 0.000061 (4) 0.0061

21. The product of two decimals is 14.837. If one decimal is 4.01, what is the other decimal? [JNV 2010]

(1) 37 (2) 3.7 (3) 3.07 (4) 3.007

22. A drum is two-third full, if 50 L more required to fill it up , how much is the capacity of the drum? [JNV 2009]

(1) 150 L (2) 120 L (3) 100 L (4) 90 L

23. The value of $\frac{1}{125}$ is [JNV 2007]

(1) 0.8 (2) 0.08 (3) 0.008 (4) 0.0008

24. The value of 0.05% is [JNV 2007]

(1) 0.0005 (2) 0.005 (3) 0.05 (4) 0.5

25. What is the decimal equivalent of $1\frac{5}{8}$? [JNV 2005]

(1) 1.58 (2) 1.62
(3) 1.622 (4) 1.625

26. 4.4% is equivalent to which of the following? [JNV 2005]

(1) $\frac{4.4}{10}$ (2) $\frac{4.4}{100}$ (3) $\frac{44}{10}$ (4) $\frac{44}{100}$

27. In decimal 80% can be expressed as [JNV 2004]

(1) $\frac{8}{10}$ (2) $\frac{8}{100}$ (3) $\frac{100}{8}$ (4) $\frac{10}{8}$

28. 5.125 when changed into fraction, becomes [JNV 2003]

(1) $5\frac{1}{125}$ (2) $5\frac{1}{25}$ (3) $5\frac{1}{8}$ (4) $51\frac{1}{4}$

29. The fraction equivalent to 1.25 is [JNV 2002]

(1) $1\frac{1}{4}$ (2) $12\frac{1}{2}$ (3) $1\frac{1}{8}$ (4) $12\frac{1}{4}$

30. A bus left Delhi for Dehradun at 10 : 15 am. It took 6 h 30 min in journey. At what time did the bus reach at Dehradun? [JNV 2002]

(1) 4 : 15 pm (2) 4 : 30 pm
(3) 4 : 45 pm (4) 5 : 00 pm

31. The product of 2, 0.2, 0.02 and 0.002 is equal to [JNV 2000]

(1) 0.016 (2) 0.0016
(3) 0.00016 (4) 0.000016

32. Which of the following is equal to 1? [JNV 2000]

(1) $\frac{0.7 \times 6}{10 \times 42}$ (2) $\frac{0.7 \times 6}{1.0 \times 4.2}$
(3) $\frac{0.7 \times 0.6}{10 \times 4.2}$ (4) $\frac{7.0 \times 6.0}{1.0 \times 4.2}$

33. Which one of the following is equal to 9? [JNV 1999]

(1) 15×0.006 (2) 15×0.060
(3) 150×0.600 (4) 15×0.600

34. $0.231 - 0.02$ is equal to [JNV 1999]

(1) 0.233 (2) 0.229
(3) 0.211 (4) 0.031

35. $\frac{3 \times 12}{10}$ can be written as [JNV 1998]

(1) 0.36 (2) 3.12 (3) 3.60 (4) 31.2

36. $\frac{77}{5}$ may be written as [JNV 1998]

(1) 15.4 (2) 15.24 (3) 15.04 (4) 1.54

37. $0.3636 \div 0.06$ is equal to [JNV 1997]

(1) 6.600 (2) 6.060
(3) 0.660 (4) 0.606

38. How will you express fraction 2/25 in decimal fraction? [JNV 1997]

(1) 0.008 (2) 0.080
(3) 0.800 (4) 8.000

Answers

1. (1)	**2.** (4)	**3.** (2)	**4.** (4)	**5.** (4)	**6.** (1)	**7.** (1)	**8.** (4)	**9.** (1)	**10.** (1)
11. (1)	**12.** (1)	**13.** (3)	**14.** (1)	**15.** (3)	**16.** (2)	**17.** (4)	**18.** (2)	**19.** (2)	**20.** (4)
21. (2)	**22.** (1)	**23.** (3)	**24.** (1)	**25.** (4)	**26.** (2)	**27.** (1)	**28.** (3)	**29.** (1)	**30.** (3)
31. (4)	**32.** (2)	**33.** (4)	**34.** (3)	**35.** (3)	**36.** (1)	**37.** (2)	**38.** (2)		

Hints and Solutions

1. According to the question

Given expression $= 2.75 - 1.25 + 4.75 - 3.80$

$= 2.75 + 4.75 - 1.25 - 3.80$

$= 7.5 - 5.05 = 2.45 = \frac{245}{100} = \frac{49}{20} = 2\frac{9}{20}$

2. Any number multiplied by zero we get zero as resultant.

$\therefore\ 3 \times 0.3 \times 0.003 \times 0 \times 30 = 0$

3. $23200 \div 145 = 160$ [given]

$\therefore 23.2 \div 1.45 = \frac{2320}{145} = 16$

4.
$$\begin{array}{r} 7.7000 \\ 7.7770 \\ +\ 7.7777 \\ \hline 31.0247 \end{array}$$

5. Suppose second decimal $= x$

Then, $x \times 4.13 = 20.7326$

$\Rightarrow x = \frac{20.7326}{4.13} = 5.02$

6. Since, $4.75 \times 0.7 = 3.325$

So, $475 \times 0.7 = 332.5$

7. Since, $48543 \div 3.3 = 1471$

So, $48.543 \div 33 = 1.471$

8. Here, Ram expenses for book and medicine

$= 178.50 + 248.25 = ₹\ 426.75$

Then, amount returned to Ram by shopkeeper

$= 500 - 426.75 = ₹\ 73.25$

9. Required decimal value $= \frac{3}{4} + \frac{4}{5} + \frac{8}{25}$

$= 0.75 + 0.80 + 0.32 = 1.87$

10. Given, $3.65 \times 0.5 = 1.825$

$\therefore\ 365 \times 0.5 = 1.825 \times 100 = 182.5$

11. $\frac{0.1}{0.01} + \frac{0.01}{0.1} = 10 + \frac{1}{10} = \frac{100+1}{10} = \frac{101}{10}$

12. $00.0675 \div 15$

$= \frac{0675}{1000 \times 15} = \frac{45}{1000} = 0.0045$

13. $101\% = \frac{101}{100} = 1.01$

14. As, $\frac{4015}{11} = 365$ then $\frac{40.15}{1.1} = 36.5$

15. Required decimal equivalent of $17\frac{1}{16}$

$= \frac{16 \times 17 + 1}{16} = \frac{272+1}{16} = \frac{273}{16} = 17.0625$

16. Suppose number $= x$

Then, $\frac{5.029}{x} = 50.29 \Rightarrow x = \frac{5.029}{50.29}$

$\therefore\ x = 0.1$

17. Required sum $= 7.7$

$$\begin{array}{r} 7.07 \\ 7.007 \\ 77.0077 \\ \hline 98.7847 \end{array}$$

18. Required decimal equivalent

$= 2200 \times \frac{4}{100} \times \frac{75}{100} = ₹\ 6.6$

19. $\frac{₹150}{₹4} = \frac{150}{400} = \frac{3}{8}$

20. $\frac{61}{10000} = 0.0061$

21. Suppose second decimal $= x$

Then, $x \times 4.01 = 14.837 \Rightarrow x = \frac{14.837}{4.01} = 3.7$

22. $\because$ Empty part of the drum $= 1 - \frac{2}{3} = \frac{1}{3}$

If $\frac{1}{3}$ part requires $= 50$ L

Then , 1 part requires $= 50 \div \frac{1}{3} = 50 \times 3 = 150$ L

23. Required value of $\frac{1}{125} = 0.008$

24. $0.05\% = \frac{0.05}{100} = 0.0005$

25. $1\frac{5}{8} = \frac{1\times8+5}{8} = \frac{13}{8} = 1.625$

26. $4.4\% = \frac{4.4}{100}$

27. $80\% = \frac{80}{100}$ or $\frac{8}{10}$

28. $5.125 = \frac{5125}{1000} = \frac{41}{8}$ or $5\frac{1}{8}$

29. $\because 1.25 = \frac{125}{100} = \frac{5}{4}$ or $1\frac{1}{4}$

30. Departure of bus from Delhi = 10:15 am

Time taken in the journey = 6 h 30 min

∴Reach the bus at Dehradun

= 10:15 + 6:30 = 16:45 or 4:45 pm

31. $2 \times 0.2 \times 0.02 \times 0.002 = 0.000016$

32. $\because \frac{0.7\times6}{1.0\times4.2} = \frac{7\times6\times10}{10\times42} = 1$

33. $\because 15 \times 0.600 = 9.000 = 9$

34.
$$\begin{array}{r} 0.231 \\ -0.020 \\ \hline 0.211 \end{array}$$

35. $\frac{3\times12}{10} = \frac{36}{10} = 3.6$ or 3.60

36.
$$\begin{array}{r} 15.4 \\ \hline 5)77.0 \\ \underline{5} \\ 27 \\ \underline{25} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

Quotient = 15.4

37. $0.3636 \div 0.06 = \frac{3636\times100}{10000\times6} = \frac{606}{100} = 6.06$

38.
$$\begin{array}{r} 25)\ 2.00\ (0.08 \\ \underline{2.00} \\ \times \end{array}$$

Practice Exercise

1. The value of $4.44 - 0.330$ is
(1) 4.00 (2) 3.99
(3) 4.11 (4) 0.429

2. The value of $1.1 - 1.01$ is
(1) 0.9 (2) 0.09
(3) 1 (4) 0

3. $2.3 + 0.62 - 1.39$ is equal to
(1) 3 (2) 1.53
(3) 3.34 (4) 5

4. The product of $1.2\times0.6\times3.12\times0.03$ is equal to
(1) 0.067392 (2) 0.063568
(3) 0.4812 (4) 0.00392

5. The product of $0.5 \times 0.05 \times 0.005$ is equal to
(1) 0.00125 (2) 0.000125
(3) 0.125 (4) 0.0125

6. The value of 2.5×0.01 is
(1) 25 (2) 0.251
(3) 0.025 (4) 2.5

7. Fill up the blank space with the correct number $4.5 \times 0.2 = \ldots$.
(1) 0.90 (2) 9.00
(3) 4.72 (4) 0.09

8. Simplify $0.2 \times 0.3 \times 0.7$.
(1) 0.237 (2) 4.2
(3) 0.042 (4) 0.420

9. The product of $0.3 \times 0.4 \times 0.7$ is
(1) 0.084 (2) 0.0084
(3) 0.84 (4) 84

10. The value of $6.75 \div 0.05$ is
(1) 120 (2) 135
(3) 130 (4) 139

11. The value of $\frac{1.298 - 0.1298}{0.04}$ is equal to
(1) 29 (2) 29.105
(3) 28.205 (4) 29.205

12. By what number should 4.3 be multiplied, so that the product is 0.43?
(1) 0.01 (2) 0.1
(3) 1.1 (4) 0.11

13. By multiplying a number by 0.6, result is 657.24. What is the result, if the number is multiplied by 0.06?
(1) 6.5724 (2) 6
(3) 65.724 (4) 657.24

14. The value of $\frac{0.5 + 0.7 + 0.3}{5}$ is equal to
(1) 0.3 (2) 3.1 (3) 0.03 (4) 1.3

15. The value of $\frac{0.037 - 0.028}{0.03}$ is equal to
(1) 3.0 (2) 0.3
(3) 0.03 (4) 0.003

16. In fraction 3.125 can be written as
(1) $3\frac{1}{25}$ (2) $3\frac{1}{8}$
(3) $3\frac{1}{125}$ (4) $31\frac{1}{4}$

17. $6 + \frac{9}{100} + \frac{1}{1000} + \frac{2}{10}$ is equal to
(1) 6.291 (2) 6.921 (3) 8.81 (4) 6.129

18. $\frac{8}{1000} + \frac{7}{100} + \frac{5}{10}$ is equal to
(1) 0.0578 (2) 0.875
(3) 0.578 (4) 0.0875

Answers

1. (3)	**2.** (2)	**3.** (2)	**4.** (1)	**5.** (2)	**6.** (3)	**7.** (1)	**8.** (3)	**9.** (1)	**10.** (2)
11. (4)	**12.** (2)	**13.** (3)	**14.** (1)	**15.** (2)	**16.** (2)	**17.** (1)	**18.** (3)		

Hints and Solutions

1. $4.44 - 0.330 = 4.11$

2.
$$\begin{array}{r} 1.10 \\ -1.01 \\ \hline 0.09 \end{array}$$

3. $2.30 + 0.62 - 1.39 = 2.92 - 1.39 = 1.53$

4. $1.2 \times 0.6 \times 3.12 \times 0.03 = 0.067392$

5. $0.5 \times 0.05 \times 0.005 = 0.000125$

6. $25 \times 0.01 = 0.025$

7. $\because\ 4.5 \times 0.2 = 0.90$

8. $0.2 \times 0.3 \times 0.7 = 0.042$

9. $0.3 \times 0.4 \times 0.7 = 0.084$

10. $\frac{6.75}{0.05} = 135$

11. $\frac{1.298 - 0.1298}{0.04} = \frac{1.1682}{0.04}$
$= \frac{11682}{10000} \times \frac{100}{4} = 29.205$

12. Let the number be x.
Then, $x \times 4.3 = 0.43$
$\Rightarrow x = \frac{0.43}{4.3} = \frac{43}{100} \times \frac{10}{43} = \frac{1}{10} = 0.1$

13. Let $x \times 0.6 = 65.724$
$\Rightarrow \quad x = \frac{65724}{0.6}$
Hence, $\frac{65724}{0.6} \times 0.06 = \frac{65724}{100} \times \frac{6}{100} \times \frac{10}{6}$
$= \frac{65724}{1000} = 65.724$

14. $\because \frac{0.5 + 0.7 + 0.3}{5} = \frac{1.5}{5} = 0.3$

15. $\frac{0.037 - 0.028}{0.03} = \frac{0.009}{0.03}$
$= \frac{9}{1000} \times \frac{100}{3}$
$= \frac{3}{10} = 0.3$

16. $3.125 = \frac{3125}{1000} = \frac{125}{40} = \frac{25}{8} = 3\frac{1}{8}$

17. $6 + 0.09 + 0.001 + 0.2 = 6.291$

18. $\frac{8}{1000} + \frac{7}{100} + \frac{5}{10} = 0.008 + 0.07 + 0.5$
$= 0.578$

Self Practice

1. The value of (6.97×0.093) will be

(1) 0.7 (2) 0.8 (3) 7.0 (4) 8.0

2. The product of 0.2, 0.02 and 0.002 is

(1) 0.016 (2) 0.0016 (3) 0.00016 (4) 0.000008

3. Which of the following simplification is equal to 1?

(1) $\frac{0.304 \times 20}{304 \times 2}$ (2) $\frac{0.304 \times 20}{3.04 \times 2}$ (3) $\frac{0.304 \times 20}{30.4 \times 2}$ (4) $\frac{0.304 \times 20}{304 \times 0.2}$

4. Subtract 82.68 from 97.836.

(1) 12.24 (2) 15.156 (3) 19.75 (4) 14.21

5. The addition of 4.23, 31.79, 5.006 and 7.5 is

(1) 49.5 (2) 35.27 (3) 48.341 (4) 48.526

6. Convert 8.125 into fraction.

(1) $\frac{5}{10}$ (2) $2\frac{3}{4}$ (3) $1\frac{1}{2}$ (4) $8\frac{1}{8}$

7. Raju deposited ₹ 23.25 in first week, ₹ 27.50 in second week and ₹ 30.75 in the third. He had deposited ₹ 250.60 earlier. Now, what is his total amount in that bank?

(1) ₹ 350 (2) ₹ 332.10 (3) ₹ 325.75 (4) ₹ 275.25

8. $1.32 \div 0.4$ is equal to

(1) 0.33 (2) 0.033 (3) 3.3 (4) 33

9. $0.5 \times 0.5 \times 0.5$ is equal to

(1) 0.125 (2) 0.0125 (3) 0.00125 (4) 1.25

10. $0.220 - 0.202$ is equal to

(1) 0.082 (2) 0.018 (3) 0.180 (4) 0.982

11. 2.05 when changed into a fraction becomes

(1) $2\frac{1}{20}$ (2) $3\frac{1}{8}$ (3) $3\frac{1}{25}$ (4) $3\frac{1}{20}$

12. The expression $\frac{7.2 + 4.8}{5.6 - 3.2}$ is equal to

(1) 8.0 (2) 5.0 (3) 2.8 (4) 1.4

13. If $187 \times 98 = 18326$, the value of $183.26 \div 18.7$ is

(1) 0.098 (2) 98 (3) 9.8 (4) 9.08

Answers

1. (1)	**2.** (4)	**3.** (2)	**4.** (2)	**5.** (4)	**6.** (4)	**7.** (2)	**8.** (3)	**9.** (1)	**10.** (2)
11. (1)	**12.** (2)	**13.** (3)							