SUBJECT-MATHEMATICS

1. Numbers

Important information

Types of numbers (classification of numbers)

❖ **Number systems are classified into the following types:**

1) Natural Number : Numbers that are used to count things are called natural numbers. is known. The natural numbers represented by N

They go. N = {1, 2, 3, 4.....}

2) Whole Numbers : Whole Numbers A number is a set of numbers that include natural numbers.

Zero is included in addition to the numbers. The whole number is represented by W.

W = {0, 1, 2, 3, 4.....}

3) Integer Number : Integers include whole numbers and negative numbers. Integer I or Z are represented by.

I = {-3, -2, -1, 0, 1, 2, 3.....}

4) Rational Numbers : Rational numbers are expressed in the form p/q where ' p' and ' q' Integers are integers with $q \neq 0$. Rational numbers are represented by Q.

Q = 5/6, 7/8 etc.

5) Irrational Numbers : Numbers that cannot be expressed in the form of p/q where ' p' and ' q' are integers and $q \neq 0$. They are denoted by Q.

Example – π = 3.141592653589793238....

6) Prime numbers - Numbers that are divisible only by 1 and the same number are called prime numbers.

There are 25 prime numbers from 1 to 100.

1 to 10	4	2, 3, 5, 7
11 to 20	4	11, 13, 17,19
21 to 30	2	23, 29
31 to 40	2	31,37
41 to 50	3	41,43,47
51 to 60	2	53,59
61 to 70	2	61, 67
71 to 80	3	71,73, 79
81 to 90	2	83, 89
91 to 100	1	97

The smallest and only even prime number = 2

Sum of prime numbers from 1 to 100 = 1060

7) Composite number - All numbers (except 1) that do not fall into the category of prime numbers are composite numbers .

Number) They go.

Example – 4, 8, 10, 22, 100 etc.

8) Coprime numbers - Coprime numbers are sets of integers that have only 1 as a common factor or the highest common factor.

The factor (mass) is 1 .

Example – 13 and 14 are coprime numbers.

9) Even Numbers : Numbers that are divisible by 2 are called even numbers.

Example – 2, 4, 6, 8, 10....

10) Odd Numbers : Numbers that are not divisible by 2 are called odd numbers.

Example – 3 5, 7, 9...

1 is not original.

Two consecutive odd prime numbers are known as a pair of prime numbers.

All natural numbers are whole , integers , rational, and real numbers.

All whole numbers are rational , integers, and real numbers.

All rational numbers include integers , because every integer can be written as a fraction with a denominator of 1. Example

(9=9/1).

The square of an even number is even and the square of an odd number is odd.

No given prime number can be a composite number.

Fractions are rational numbers.

Zero is neither an even nor an odd number.

If x is any number , then if x is divided by zero , the result is zero. If 0 is divided by x , the result is

If it is infinite or undefined or indefinite then 0/x =0, but x/0 = ∞ (infinity) where x is a real number.

The sum and product of two rational numbers are always rational numbers.

The product or sum of a rational number and an irrational number is always an irrational number.

Sample questions

1) How many prime numbers are there between 21 and 40? ①●③④

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

Explanation - There are 4 prime numbers between 21 and 40. (23,29, 31,37)

2) 3.25 of this Identify the form of the fraction. ①②●④

1) 5/2 2) 6/3 3) 13 /4 4) 9/2

Explanation - 13/4 means 13 divided by 4. When 4 is divided by 13, the answer is 3.25.

3) Identify the decimal form of 158/12. ①②③④

1) 13.25 2) 13.29 3) 13.21 4)13.16

Explanation - When 158 is divided by 12, the answer is 13.16.

Exercise

Identify the form of the fraction.

1) Identify the fractional form of 4.5. ①②③④

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

2) 3.75 Identify the fractional form of this. ①②③④

1) 13/4 2) 11/4 3) 15/4 4) 10/4

3) Identify the fractional form of 11.11. ①②③④

1) 58/8 2) 55/7 3) 100/9 4) 75/6

4) Identify the fractional form of 14.28. ①②③④

1) 60/7 2) 50/6 3)100/7 4) 58/7

5) Identify the fractional form of 22.57. ①②③④

1) 141/7 2) 150/6 3)100/7 4) 158/7

Identify the form of decimal Fraction.

6) Identify the decimal fraction form of 229 /10 0 . ①②③④

1) 229 2) 22.9 3) 2.29 4) 0.229

7) Identify the decimal fraction form of 123 / 9 . ①②③④

1) 14.23 2) 13.66 3) 14.11 4) 17.30

8) Identify the decimal form of 222/7 . ①②③④

1) 31.71 2) 17.11 3) 15.34 4) 17.57

9) Identify the decimal form of 342/8 . ①②③④

1) 29.25 2) 42.75 3) 30.21 4) 31.20

10) Identify the decimal fraction form of 790/21 . ①②③④

1) 23.33 2) 25.33 3) 24.92 4) 37.61

Identify the fraction that has a recurring decimal form.

11) 1) 128/3 2) 324/13 3) 125/4 4) 125/12 ①②③④

12) 1) 158/12 2) 420/15 3) 125/3 4) 335/12 ①②③④

13) 1) 580/12 2) 204/11 3) 255/12 4) 545/12 ①②③④

14) 1) 546/8 2) 405/15 3) 785/7 4) 548/3 ①②③④

15) 1) 3442/1 8 2) 456 / 1 2 3) 678/ 8 4) 458/ 4 ①②③④

Identify which fraction is not recurring.

16) 1) 100 0 /3 2) 3442/1 8 3) 154/ 1 6 4) 254/3 ①②③④

17) 1) 548/3 2) 125/3 0 3) 580 / 12 4) 20 0 4 / 15 ①②③④

18) How many even numbers are there between 1 and 100? ①②③④

1) 22 2) 50 3) 100 4) 23

19) What is the sum of even numbers between 1 and 100 ? ①②③④

1) 52 34 2) 5050 3) 50 00 4) 5 060

20) A) The sum of an even and an odd number is even. ①②③④

B) The sum of an even and an odd number is odd.

C) The sum of two odd numbers is even.

D) The sum of two even numbers is even.

1) All statements are correct 2) All statements are incorrect

3) A is incorrect All the rest are correct 4) A, B, D are correct C is incorrect

2. Square and square root

Important information

❖ Class

To a number Multiply by itself The resulting number is The square of that number Yes.

Examples : $2^2 = 2 \times 2 = 4$ $5^2 = 5 \times 5 = 25$ $10^2 = 10 \times 10 = 100$ $(-6)^2 = (-6) \times (-6) = 36$

1) Square of any negative numbers is always positive.

2) When squaring a decimal fraction, the decimal symbols are doubled.

❖ What is square root ?

If a number is squared to give another number , then the square root of that second number is the original number.

To show the square root √ These symbols are used.

When taking the square root of a decimal fraction, the decimal symbols are halved.

Number	square	Number	square	Number	square	Number	square	Number	square	Number	square
1	1	**6**	36	**11**	121	**16**	256	**21**	441	**26**	676
2	4	**7**	49	**12**	144	**17**	289	**22**	484	**27**	729
3	9	**8**	64	**13**	169	**18**	324	**23**	529	**28**	784
4	16	**9**	81	**14**	196	**19**	361	**24**	576	**29**	841
5	25	**10**	100	**15**	225	**20**	400	**25**	625	**30**	900

Sample questions

1) 1) $\sqrt{\mathbf{169}}$+15 2 How much is this worth? ①●③④

1) 244 2) 238 3) 194 4) 196

Explanation - √169 =13 and 152=225, therefore, 13+225=238

2) Which of the following options is not a complete class ? ①②●④

1) 144 2) 256 3) 320 4) 400

Explanation - 122=144=, 162=256, and 202=400 320 is not a square of any integer. Therefore, option number-3 320 is not a perfect square.

3) $(\sqrt{81})3$ – What is the value of 122 ? ●②③④

1) 585 2) 513 3) 144 4) 81

Explanation - The square root of 81 is 9 and then the cube of 9 = 729 and from that, 122 = 144 is subtracted, giving the answer 585.

Exercise

1) What is the square root of 10000 ? ①②③④

1) 10 2) 100 3) 1000 4) 11

2) 2025 =? ①②③④

1) 15^2 2) 45^2 3) 20^2 4) 30^2

3) What is the value of the square root of 0.000144 ? ①②③④

1) 0.12 2) 0.0012 3) 0.012 4) 12

4) Which of the following numbers is a perfect square ? ①②③④

1) 1500 2) 3025 3) 3000 4) 3500

5) 1444 =? ①②③④

1) 36^2 2) 38^2 3) 50^2 4) 42^2

6) If $x^2 = 121321$, then x =? ①②③④

1) 91 2) 110 3) 111 4) 121

7) What is the square root of 3364 ? ①②③④

1) 58 2) 4 8 3) 4 7 4) 68

8) What is the value of the square root of 0.000009 ? ①②③④

1) 0.03 2) 0.0003 3) 0.003 4) 0.09

9) What is the square of 75 ? ①②③④

1) 12 25 2) 14 25 3) 10 25 4) 56 25

10) 1089 =? ①②③④

1) 31^2 2) 33^2 3) 35^2 4) 23^2

11) $\sqrt{1.5625}$ =? ①②③④

1) 1.15 2) 1.25 3) 1.35 4) 1.45

12) What is the value of $\sqrt{2.25}$? ①②③④

1) 1.3 2) 1.4 3) 1.5 4) 1.6

13) Which of the following numbers is not a perfect square ? ①②③④

1) 484 2) 3136 3) 1849 4) 1088

14) $\sqrt{(4600 + 5400)}$ =? ①②③④

1) 110 2) 100 3) $\sqrt{85}$ 4) None of the above

15) If 0 appears at the end 3 times in the square of a number (e.g. 1000, 4000), then which digit will appear at the end of that number ? ①②③④

1) 0 2) 5 3) 1 4) 2

16) $\sqrt{0.0\,00\,001}$ =? ①②③④

1) 0.01 2) 0.001 3) 0.1 4) 0.0001

17) Choose the incorrect option from the following . ①②③④

1) $37^2 = 1369$ 2) $39^2 = 1521$ 3) $51^2 = 2600$ 4) $43^2 = 1849$

18) $\sqrt{0.00000081}$ = ? ①②③④

1) 0.03 2) 0.003 3) 0.3 4) 0.0009

19) Which of the following is not a whole square ? ①②③④

1) 3364 2) 3025 3) 5000 4) 4624

20) What is the square root of 7225 ? ①②③④

1) 85 2) 75 3) 65 4) 95

3. Cube and cube root

Important information

❖ **cube -** To a number Multiply itself three times The number that is obtained is equal to that number. Cube It is said. $a^3 = a \times a \times a$

Examples :

$2^3 = 2 \times 2 \times 2 = 8$, $4^3 = 4 \times 4 \times 4 = 64$, $(-3)^3 = (-3) \times (-3) \times (-3) = -27$

When cubed, the decimal points are tripled.

Remember :

Cube of a negative number There is always negative

What is a cube root? ?

The cube of a number that gives another number is the cube of that second number . The cube root is the original number. Yes.

To show cube roots $\sqrt[3]{}$ These symbols are used.

$\sqrt[3]{(a^3)} = a$

Examples :

$\sqrt[3]{8} = 2$, $\sqrt[3]{64} = 4$, $\sqrt[3]{-27} = -3$

❖ **Cube number**

Number	Cube	Number	Cube	Number	Cube	Number	Cube
1	1	**9**	729	**17**	4913	**25**	15625
2	8	**10**	1000	**18**	5832	**26**	17576
3	27	**11**	1331	**19**	6859	**27**	19683
4	64	**12**	1728	**20**	8000	**28**	21952
5	125	**13**	2197	**21**	9261	**29**	24389
6	216	**14**	2744	**22**	10648	**30**	27000
7	343	**15**	3375	**23**	12167		
8	512	**16**	4096	**24**	13824		

Sample questions

1) $5^3 - 3^3$ What is the value of this ? ●②③④

1) 98 2) 125 3) 64 4) 27

Explanation - $5^3=125$, $3^3=27$. Therefore, 125−27=98. Option number 1 is correct.

2) Which of the following options is not a cube root ? ①②③●

1) 216 2) 343 3) 512 4) 300

Explanation - $6^3=216=216$, $7^3=343$, $8^3=512$ 300 is not a cube of any integer. Therefore option number 4 is correct.

3) If n3=729, then $(n+2)^3$ How much is the value of ? ①●③④

1) 1000 2) 1331 3) 1728 4) 2197

Explanation $n^3 = 729$ so n = 9. Now, $(9+2)^3 = (11)^3 = 1331$ so option number 2) 1331 is

Exercise

1) If $x^3 = 12167$, then what is the value of x ? ①②③④

1) 17 2) 19 3) 21 4) 23

2) 4913 is the cube of which number ? ①②③④

1) 11 2) 13 3) 17 4) 21

3) $\sqrt[3]{(19683)} = ?$ ①②③④

1) 19 2) 21 3) 23 4) 27

4) If $a^3 + b^3 = 513$ and a + b = 9 , then what is the value of ab ? ①②③④

1) 4 2) 6 3) 8 4) 10

5) $\sqrt[3]{(10648)} = ?$ ①②③④

1) 18 2) 20 3) 21 4) 22

6) If the cube of a number is 39304 , then what is that number ? ①②③④

1) 28 2) 30 3) 32 4) 34

7) If $x^3 - 4913 = 0$, then x =? ①②③④

1)12 2) 13 3) 17 4) 14

8) 15625 is the cube of which number ? ①②③④

1) 23 2) 24 3) 25 4) 26

9) Which of the following numbers is a perfect cube ? ①②③④

1) 6000 2) 8000 3) 3000 4) 4000

10) $\sqrt[3]{(24389)} = ?$ ①②③④

1) 31 2) 33 3) 27 4) 29

11) If $x^3 = 13824$, then x = ? ①②③④

1) 18 2) 20 3) 22 4) 24

12) What is the root of the equation $x^3 - 21952 = 0$? ①②③④

1) 28 2) 38 3) 48 4) 18

13) $\sqrt[3]{(35937 + 3367)}$ = ? ①②③④

1) 34 2) 32 3) 30 4) 33

14) The cube of a number is 19683. What is that number ? ①②③④

1) 23 2) 27 3) 29 4) 31

15) If $x^3 = y^3$,, then which of the following is the correct conclusion ? ①②③④

1) x = y 2) x = −y 3) x = y or x = −y 4) y = 0

16) If $x^3 = -8000$, then x = ? ①②③④

1) −20 2) 20 3) −200 4) 200

17) $\sqrt[3]{(8000 - 3087)}$ = ? ①②③④

1) 11 2) 13 3) 15 4) 17

18) If $a^3 = 125$ and $b^3 = 64$, then $(a + b)^3$ = ? ①②③④

1) 1000 2) 729 3) 189 4) 512

19) Which number is both a cube and a square? ①②③④

1) 441 2) 729 3) 216 4) 100

20) 42875 is the cube of which number ? ①②③④

1) 22 2) 26 3) 30 4) 35

4. LCM –HCF

Important information

❖ Greatest Common Divisor (G.S.V)

The largest common divisor of a given set of numbers is called the greatest common divisor.

The common denominator of 36 and 45 is ----- 9.

1) The common root of two numbers is 1.

E.g. 18 and 15 AD = 1

2) The common common multiple of two natural numbers is 1.

E.g. AD of 24 and 25 = 1

3) The common common multiple of even numbers in two sequences is 2.

E.g. 16 and 18 AD = 2

❖ Least common multiple (L.C.M.)

The smallest common divisor of a given number is called the LCM of that number.

1) LCM of 15 and 24 = 120

2) The LCM of two consecutive natural numbers is their product.

3) The LCM of two common roots is the product of those numbers.

4) The LCM of two consecutively even numbers is half their product. Therefore, their GCM is 2.

5) The LCM of two consecutive odd numbers is their product or the square of the middle number minus one.

Product of two numbers = L.s.v X m.s. Vs

First Number X Second Number = Lasavi X Masavi

First number $= \frac{\text{L.C.M X H.C.F}}{\text{Second number}}$

H.C.F. $= \frac{\text{L.C.M X G.C.D}}{\textit{First}\text{ number}}$

L.C.M. $= \frac{\textit{First}\text{ number X }\textit{Second}\text{ number}}{\text{L.C.M.}}$

$\frac{\textit{First}\text{ number X }\textit{Second}\text{ number}}{\text{G.C.D..}}$

Sample questions

1) Which smallest number is divisible by 25, 30, 40 ? ①②③④

1) 600 2) 1200 3) 900 4) None of these

2) The sum of 70 and 105 is 210, then what is the sum? ①②③④

1) 35 2) 24 3) 48 5) 23

Explanation **- LCM x HCF = First number x Second number**
210 x HCF = 70 x 105
HCF = (70 x 105)/210
HCF = 35

Exercise

1. What is the difference between 12 and 18 ? ①②③④

1) 6 2) 12 3) 18 4) 36

2. What is the difference between 8 and 10 ? ①②③④

1) 40 2) 80 3) 20 4) 10

Find the common multiple of 24, 36, and 48 . ①②③④

1) 12 2) 6 3) 24 4) 8

4. The common denominator of two numbers is 5 and the common denominator is 60. If one number is 15 , what is the other number ? ①②③④

1) 20 2) 25 3) 30 4) 10

5. What is the sum of 9, 15, and 21 ? ①②③④

1) 315 2) 105 3) 210 4) 420

6. What is the difference between 105 and 140 ? ①②③④

1) 35 2) 5 3) 7 4) 14

7. What is the product of the L.C.M. and H.C.F. of 16 and 24 ? ①②③④

1) 384 2) 48 3) 192 4) 96

the smallest 3- digit number that is divisible by 6 ? ①②③④

1) 100 2) 102 3) 104 4) 106

What is the smallest number that is evenly divisible by 5, 10, and 15 ? ①②③④

1) 15 2) 30 3) 60 4) 5

10. Find the common multiple of 24 and 36 . ①②③④

1) 12 2) 6 3) 24 4) 8

11. The common denominator of two numbers is 11 and the common denominator is 7700. If one of the numbers is 275 , find the other number. ①②③④

1) 308 2) 310 3) 312 4) 315

12. Find the common multiple of 96 and 404 . ①②③④

1) 4 2) 12 3) 8 4) 6

13. Three numbers are in the ratio 2:3:4 . Their common denominator is 12 , so find the number.

1) 24, 36, 48 2) 12, 18, 24 3) 20, 30, 40 4) 18, 27, 36 ①②③④

14. What is the smallest number that leaves a remainder of 3 when divided by 15, 20, and 25 ?

1) 153 2) 303 3) 75 4) 123 ①②③④

15. What is the smallest number that is evenly divisible by 1, 6, 8, and 12 ? ①②③④

1) 48 2) 60 3) 120 4) 200

16. What is the common denominator of 35, 49, and 77 ? ①②③④

1) 7 2) 14 3) 21 4) 35

17. The sum of two numbers is 13 and the sum of two numbers is 1989. If one number is 117 , find the other number. ①②③④

1) 221 2) 234 3) 216 4) 208

18. In a school , students can be lined up in rows of 40 or 60. In either case, what is the minimum number of students required to form a complete row? Should be ? ①②③④

1) 120 2) 60 3) 240 4) 180

19. What is the sum of 36, 48 , and 72 ? ? ①②③④

1) 144 2) 288 3) 216 4) 72

20. Three palm trees of lengths 54 cm , 72 cm , and 90 cm are to be cut into pieces of equal length. Find the length of each piece. What is the maximum length ? ①②③④

1) 18 2) 9 3) 6 4) 12

5. Percentage

Important information

What is percentage ?

" Percentage is used to show how many parts are in every 100. "

"Percentage" = part per hundred

E.g. 25% means 25 parts out of 100.

❖ Basic formulas for percentages

Percentage = (given number / total number) × 100

Find the number = (Percentage × Total number) / 100

Percentage increase = (Increased amount / Original amount) × 100

Percentage decrease = (Decreased amount / Original amount) × 100

Original amount = (Amount after increase/decrease × 100) / (100 ± percentage)

❖ Uses of percentages (real-life uses)

Type of use	Example	Explanation
Marks	80% score	80 points out of 100
/ Loss	25% profit	Goods worth ₹100 sold for ₹125
Discount	10% discount	₹10 off on an item worth ₹100
Interest	5% annual interest	Get ₹5 per year on ₹100
Population growth/decline	15% increase	The population of a village increases by 15%.
Average change	Increase by 10%	Average income increases by 10%

Sample questions

40 students in a class . 30% of them are girls. So what is the number of boys ? ①②●④

1) 12 2) 24 3) 28 4) 30

Explanation - 30% girls = 30/100×40=12 Therefore, number of boys = Total − Girls = 40 − 12 = 28

2) 20% of a number is 50 , then what is that number ? ①②③④

1) 200 2) 250 3) 300 4) 350

Explanation - Suppose the number is x. 20/100×x=50 x=50×5=250 so that number = Option 2) 250

3) If a number is first increased by 20% and then decreased by 20% , what is the net change in percentage? ? ●②③④

1) 4% decrease 2) 4% increase 3) 0 % change 4) 10% decrease

Explanation - Suppose number = 100
20% increase = 100+20=120
20% decrease = 120−20% of 120=120−24=96
Net change = 100−96=4% So option number 1 is correct.

Exercise

1. What is 20% of 150 ? ? ①②③④

1) 30 2) 25 3) 35 4) 40

2. If a number is increased by 25% , it becomes 200. What is the original number ? ①②③④

1) 160 2) 150 3) 180 4) 175

3. If 15% discount is given on Rs. 500 , what is the amount ? ? ①②③④

1) 425 2) 450 3) 475 4) 400

4. If you get 68 marks out of 80 marks , what is the percentage ? ①②③④

1) 85% 2) 80% 3) 75% 4) 90%

5. A scored 20% more marks than B. If B 's marks are 250 , then what is A 's marks ? ①②③④

1) 300 2) 280 3) 320 4) 350

6. A shopkeeper made a profit of 20% by selling an item for Rs . 1200. What was the purchase price of the item ? ①②③④

1) 1000 2) 950 3) 1100 4) 1050

7. The population of a city increases by 5% every year . If the current population is 20,000 , what will the population be after 2 years ?

1) 22,050 2) 22,500 3) 21,000 4) 23,000 ①②③④

8. The printed price of a book is Rs. 400. If two consecutive discounts of 10% and 15% are given , what is the selling price ?

1) 306 2) 300 3) 290 4) 280 ①②③④

9. If 5 liters of water is added to a solution containing 20% sugar , the percentage of sugar becomes 15% . What is the original volume of the solution ?

1) 20 liters 2) 15 liters 3) 25 liters 4) 30 liters ①②③④

10. A 's income is 30% more than B's , and B 's income is 20% less than C's . If C 's income is 25,000 , then what is A 's income ? ①②③④

1) 26,000 2) 24,000 3) 30,000 4) 32,500

11. The printed price of a shirt is Rs. 1200. If two consecutive discounts of 10% and 15% are given , what is the final selling price ? ①②③④

1) 900 2) 918 3) 950 4) 1000

12. In an examination , 60% of the students failed in English and 45% in Mathematics. If 25% failed in both the subjects , then how many What percentage of students passed in both subjects ? ①②③④

1) 20% 2) 25% 3) 30% 4) 35%

13. The price of an item is increased by 20% and then a 20% discount is given. What is the net change ? ①②③④

1) 4% decrease 2) 4% increase 3) 8% decrease 4) No change

14. In an election , A Candidate A got 55% votes , while B got 45% votes. If A 's votes are 2000 more than B's , then there are more , how many votes are there in total ? ①②③④

1) 20,000 2) 18,000 3) 15,000 4) 25,000

15. 40% of a number is 60% of another number . If the first number is 90 , what is the second number ? ①②③④

1) 60 2) 75 3) 80 4) 50

16. How much is the simple interest on Rs. 300 for 3 years at 10% rate ? ①②③④

1) 90 2) 100 3) 110 4) 120

17. The length of a rectangle is increased by 20% and the breadth is decreased by 10% . What is the percentage change in the area ? ①②③④

1) 8% increase 2) 8% decrease 3) 10% increase 4) 10% decrease

18. There are 60% boys in a class . If there are 20 girls , then what is the total number of students in the class ? ①②③④

1) 50 2) 60 3) 40 4) 30

19. If 4 liters of a solution containing 25% sugar is mixed with a 40% sugar solution , what is the new percentage ? ①②③④

1) 34 % 2) 35% 3) 30% 4) 28%

20. If the side of a square is increased by 30% , what is the percentage increase in the area ?

1) 69% 2) 60% 3) 30% 4) 90% ①②③④

6. Ratio and Proportion

Important information

❖ Ratio (Ratio) :

When two similar quantities are compared in the form of a quotient , it is called a ratio.

Example: 2 : 3 , 5 : 7

❖ Formula :

Ratio = first number / second number

Example : If the number of boys in a class is 10 and the number of girls is 15 , then the ratio = 10 : 15 = 2 : 3

❖ Quantity

Two ratios of four numbers are compared and if they are equal , then the four numbers are in proportion.

Example: If a : b = c : d , then a, b, c, d are said to be in proportion. This is written – a : b :: c : d

Formula :

a : b = c : d

So , a × d = b × c (cross multiplication method)

Example:

3 : 4 = 6 : 8

Let's check: 3 × 8 = 24 and 4 × 6 = 24 That is, these are in proportion.

❖ **Types of quantity:**

Even proportion

If one amount increases, the other amount also increases (or both decrease).

For example, if the number of people working increases, the work gets completed faster.

inverse ratio

If one amount increases , the other amount decreases.

For example, if the speed increases, the time taken decreases.

Important points :

Ratios are only used for quantities of the same type (such as two lengths or two weights). For intermediate quantities in a quantity: b

And c is called the middle term (mean) . a and d are called the extremes .

If a : b = c : d, then a × d = b × c

Sample questions

1) If a:b=3:4 and b:c=8:5, then what is a:c ? ●②③④

1) 6 : 5 2) 5 : 6 3) 3 : 5 4) 5 : 3

Explanation - a:b=3:4a:b=3:4
b:c=8:5b:c=8:5
To make b equal in both ratios, multiply the first ratio by 2:
a:b=6:8
Now a:b:c=6:8:5
Therefore, a:c=6:5

2) The ratio of milk and water in a mixture is 7:3 . If how many Pour a liter of water , that is New in the new mix Ratio 3 : 2 will be ? ●②③④

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

Explanation - Old ratio = 7x + 3x = 30
10x = 30 X= 3
So milk = 21 and water = 9 liters
21/9+x = 3/2
42 = 27+3x
42-27 = 3x
15 = 3x
X= 5 So 5 liters of water have to be poured.

Exercise

1. Simplify the ratio: 24 : 36 ①②③④

1) 2:3 2) 3:2 3) 4:5 4) 5:4

2. Find the missing term in the ratio: 3 : 5 = ___ : 15 ①②③④

1) 9 2) 10 3) 12 4) 15

If Rs. 1000 is divided between A and B in the ratio 3:2 , what is B 's share ? ①②③④

1) 400 2) 600 3) 500 4) 300

4. What is the value of the middle common term of 8 and 18 ? ①②③④

1) 20 2) 12 3) 21 4) 13

5. The ratio of boys to girls in a class is 5:3 . If there are 25 boys , then how many girls are there?

1) 15 2) 20 3) 10 4) 18 ①②③④

6. The ratio of two numbers is 4:7 . If their difference is 45 , then what is the smaller number ?

1) 60 2) 105 3) 45 4) 65 ①②③④

7. 8 workers complete a piece of work in 15 days. How many workers will be required to complete the same piece of work in 10 days ? ①②③④

1) 12 2) 10 3) 18 4) 20

8) The income of A, B, and C is in the ratio 2:3:5 . If C 's income is Rs. 15,000 more than A's , then what is B 's income ? ①②③④

1) 10,000 2) 15,000 3) 20,000 4) 25,000

9. A mixture contains milk and water in the ratio 4:3 . If 10 liters of water is added to make the ratio 1:1 , then the initial volume of the mixture is How much is the quantity ? ①②③④

1) 35 2) 50 3) 70 4) 100

10. A bag contains coins of Rs . 5 , Rs . 10 and Rs . 20 in the ratio 4:3:5 . If the total amount in the bag is Rs . 600 , many 10 rupee coins? ? ①②③④

1) 15 2) 20 3) 25 4) 12

The ratio of the ages of A and B is 3:5 . After 10 years this ratio will become 4:5 . Then what is the present age of A ? ①②③④

1) 6 2) 20 3) 30 4) 5

12. 400 grams of sugar solution contains 30% sugar. How much sugar should be added to make it 50% sugar ? ①②③④

1) 80 2) 100 3) 120 4) 160

13. In a 60 litre mixture, milk and water are in the ratio 7:5 . How many litres of water should be added so that the ratio becomes 1:1 ? ①②③④

1) 5 2) 10 3) 15 4) 20

14. The selling price of an item sold at a profit of 20% is Rs. 600. Then what is the purchase price?

1) 500 2) 450 3) 480 4) 520 ①②③④

15. The weight of a 20 meter long cloth is 5 kg. So what is the weight of 12 meter long cloth ?

1) 2 2) 3 3) 4 4) 5 ①②③④

16. In a class of 40 students, the ratio of boys to girls is 3:1 . If 10 girls join , what will be the new ratio ? ①②③④

1) 2:1 2) 3:2 3) 4:3 4) 1:1

17. The capital of A, B, and C is in the ratio 2:3:4 . If the total profit is Rs. 27,000 , what is the share of B ? ①②③④

1) 6,000 2) 9,000 3) 12,000 4) 15,000

18. Rs. 2400 is divided among A, B, and C in the ratio 2:3:5 , then what is C 's share ? ①②③④

1) 800 2) 1200 3) 600 4) 1000

19) The ratio of the cost of a cupboard and a table is 7:3 . If the cost of a cupboard is Rs. 11200 , then the cost of 4 tables is How much ? ①②③④

1) 18200 2) 19000 3) 20000 4) 19200

20) What is the fourth common term of the numbers 10, 5, x, and 25 ? ①②③④

1) 60 2) 50 3) 150 4) 200

7. Single variable equations

Important information

A single equation This is an equation in which Just one variable and its exponent is There is always 1 . Only Single variable (like x, y, a etc.) Exponent of a variable It is never more than 1 .

Equation with '=' sign Divided into two sides

In the equation To solve the equation, we need to find the value of the variable.

Important steps to remember:

same action Do it on both sides . In the equation Let's go to the same side. Should be kept .

Check the equation – Plug the final answer into the original equation .

Sample questions

1) The price of an adult ticket for a movie is ₹20 more than a child ticket. A ticket for 2 adults and 3 children costs ₹370. Done. Find the price of the children's ticket . ①②③④ ●

1) 55 2) 22 3) 66 4) 44

Explanation -

Let's say child ticket = x
Adult ticket = x+20
3x + 2(x+20)= 370
3x+2x+40 = 370
5x+40 = 370
5x=370-40
5x=330
X= 330/5
X=66

2) The result of adding 9 to four times a number is 3 more than twice that number . Find that number. ①②●④

1) 2 2) -2 3) -3 4) 3

Explanation - 4x + 9 = 2x + 3
4x - 2x = 3 - 9
2x = -6
x = -3
So the number is -3.

3) If you subtract 6 from four times a number , you get 26. What is that number ? ①●③④

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

Explanation -

Quadruple means = 4x- 6 = 26
4x = 26-6
4x = 20
X = 20/4
X= 5 Answer = 5

Exercise

1. Solve the equation: 3x+ 5=20 ①②③④

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

2. Solve the equation: 2(x−4)= 10 ①②③④

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

3. Solve the equation: 3x+4=7 ①②③④

1) 6 2) 9 3) 12 4) 15

4. Solve the equation: 5x−3=2x+12 ①②③④

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

5. Solve the equation: 4(2x+1)= 28 ①②③④

1) 3 2) 4 3) 5 4) 6

6. If 3 is subtracted from 5 times a number , the answer is 27. What is that number ? ①②③④

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

7. The sum of two consecutive numbers is 45. Find the numbers. ①②③④

1) 22, 23 2) 21, 24 3) 20, 25 4) 19, 26

8. The length of a rectangle is 10 cm more than its width. If the perimeter is 60 cm , what is the length ? ①②③④

1) 15 2) 20 3) 25 4) 30

9) If you subtract twice the number from three times the number, the answer is 18. What is that number ? ①②③④

1) 12 2) 18 3) 20 4) 36

10) If 5 is subtracted from four times a number , the answer is equal to three times that number. What is that number ? ①②③④

1) 20 2) 15 3) 25 4) 5

11) If you add 6 to double an age, that age becomes 40 years. So what was the original age ?

1) 18 2) 20 3) 22 4) 17 ①②③④

12) A father is three times the age of his son , and 4 years ago the father's age was four times the age of the son. The son's present age is How old are you ? ①②③④

1) 12 2) 16 3) 20 4) 24

13) The sum of three times a number and its sixth part is 63. What is that number ? ①②③④

1) 18 2) 24 3) 30 4) 36

14) If you add 5 to four times the age of one person, you get the age of the second person. If the age of the second person is 45 , then what is the age of the first person ? ①②③④

1) 10 2) 12 3) 15 4) 18

15) If you subtract half of a number from three times its value, the answer is 24. What is that number ? ①②③④

1) 12 2) 16 3) 18 4) 20

16) If half of a number is subtracted from three times its value, the answer is 40. It comes. What is that number ? ①②③④

1) 18 2) 16 3) 30 4) 36

17) After giving 25% discount on an item , it is sold for ₹600 . What is the original price ?

1) ₹700 2) ₹720 3) ₹750 4) ₹800 ①②③④

18) The age of a father is three times that of his son. If the sum of their ages is 64 , then what is the age of the son ?

1) 12 2) 14 3) 16 4) 18 ①②③④

19) The answer is equal to three times the sum of the two times the number 10. What is that number ? ①②③④

1) 10 2) 20 3) 30 4) 40

20) Half of a number is 5 If we subtract, the answer is 13. What is that number ? ①②③④

1) 30 2) 32 3) 34 4) 36

8. Equations in two variables

Important information

❖ **What is a linear equation in two variables ?**

two variables (x and y) and each variable having an exponent of 1 is called a linear equation in two variables .

❖ **The general form of this is:**

ax+ by+c=0ax+by+c=0 Here a, b, c are real numbers and a and b are not zero at the same time .

❖ **Important points**

Equations in two variables are mainly based on the relationship between the two unknowns, x and y . After solving such equations

The unique value of both variables (x, y). Got it. These equations are used for various mathematical and real-life problems ,

Such as age , number of people , area , etc.

Sample questions

1) The cost of a notebook is ₹15 and the cost of a book is ₹35 . If Ganesh buys 2 notebooks and 1 book , what is the total cost ?

1) ₹50 2) ₹55 3) ₹60 4) ₹65 ①②③●

Explanation – Notebook = ₹15
Book = ₹35
2 books 5 and 1 book = ?
Cost = 2×15 + 1×35 = 30 + 35 = ₹ 65

2) The sum of two numbers is 40. If the first number is doubled and the second number is tripled, the sum becomes 100. Then the two Find the numbers. ①●③④

1) 10, 30 2) 20, 20 3) 15, 25 4) 25, 15

Explanation - x = first number, y = second number
Equation 1: x + y = 40
Equation 2: 2x + 3y = 100
Equation 1 multiplied by 2 = 2 (x + y = 40) = 2x + 2y = 80
Subtracting this equation from the second equation gives y = 20
x + 20 = 40
x = 40- 20
x = 20 Two numbers also = 20, 20

3) Twice a number is 4 more than another number. The sum of both the numbers is 32. Find the two numbers. ①●③④

1) 10, 22 2) 12, 20 3) 14, 18 4) 16, 16

Explanation – x = first number y = second number
Equation 1: 2x = y + 4 ie 2x – y = 4
Equation 2: x + y = 32
Summing up Equations 1 and 2
3x = 36
X = 12
Two numbers = 12, 20

Exercise

1) The sum of two numbers is 30. If the first number is 10 , what is the second number?

1) 10 2) 15 3) 20 4) 25 ①②③④

2) The cost of a notebook is Rs. 15 and the cost of a book is Rs. 35. If Ganesh buys 2 notebooks and 1 book , then the total cost is How much ? ①②③④

1) Rs.60 2) Rs.55 3) Rs.50 4) Rs.65

3) If 2x + y = 10 and x = 2 , then what is the value of y ? ①②③④

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

4) The sum of twice a number and three times another number is 18. If the first number is 3 , what is the second number ? ①②③④

1) 3 2) 4 3) 5 4) 6

5) The sum of two numbers is 80. If the second number is subtracted from twice the first number , the answer is 40. Find the numbers. ①②③④

1) 30, 50 2) 40, 40 3) 50, 30 4) 20, 60

6) A fruit seller has 100 apples and oranges together . Apples are sold at Rs . 10 each and oranges at Rs. 5 each. sells. If the total price is Rs. 700 , find the number of apples and oranges.

1) 40, 60 2) 50, 50 3) 30, 70 4) 60, 40 ①②③④

7) The total cost of a bicycle and a scooter is Rs. 60,000 . If the price of the bicycle is twice the price of the scooter, If so , find their price. ①②③④

1) 20,000; 40,000 2) 24,000; 36,000 3) 30,000; 30,000 4) 40,000; 20,000

8) The sum of two numbers is 20. If the sum of those numbers is 100 , then find the numbers.

1) 60, 40 2) 70, 50 3) 80, 60 4) 90, 70 ①②③④

9) The sum of the salaries of two persons is Rs. 75,000 . If the salary of the second person is 1.5 times the salary of the first person , then their Find the salary. ①②③④

1) 30,000; 45,000 2) 35,000; 40,000 3) 25,000; 50,000 4) 28,000; 47,000

10) In a cinema, an adult ticket costs Rs. 150 and a child ticket costs Rs. 100. A total of 30 tickets cost Rs. 3900. Adults And find the number of children. ①②③④

1) 10, 20 2) 15, 15 3) 20, 10 4) 12, 18

11) A shopkeeper has 100 scales. Some are priced at Rs. 10 and some at Rs. 20. If the total price is Rs. 1500 If so , find the ratio of the two types. ①②③④

1) 50, 50 2) 75, 25 3) 60, 40 4) 70,30

12) There are 50 boys and girls in a class . The number of girls is 10 more than the number of boys. Find the number of girls and boys.

1) 20, 30 2) 30, 20 3) 25, 25 4) 28, 22 ①②③④

13) The total fare of a truck and a tempo is Rs. 4500. If the fare of the truck is double that of the tempo , then what is the fare of each ?

1) 1500, 3000 2) 2000, 2500 3) 1000, 3500 4) 3000, 1500 ①②③④

14) The price of a book and the price of a notebook together is Rs. 120. If the price of the notebook is 2/3 of the price of the book , then Find the price of both. ①②③④

1) 72, 48 2) 60, 60 3) 80, 40 4) 90, 30

15) There are 90 people including children and adults in a park . The entry fee is Rs. 10 for each child and Rs. 20 for each adult . Total

1400 was collected. Find the number of children and adults. ①②③④

1) 50, 40 2) 40, 50 3) 30, 60 4) 60, 30

16) The length and breadth of a square are 100 meters together. If the length is 20 meters more than the breadth , find the length and breadth Find. ①②③④

1) 60, 40 2) 50, 50 3) 55, 45 4) 70, 30

17) A company has 300 employees, both male and female . The number of women is 60 more than that of men. Find the difference between their number. ①②③④

1) 120, 180 2) 100, 200 3) 130, 170 4) 150, 150

18) Two trains are coming towards each other from two different cities at the same time. The speed of one train is 60 km/h and the speed of the other is 40 km/ h. km/hr. If both meet after 5 hours , then what is the distance between the two cities ? ①②③④

1) 400 km 2) 500 km 3) 300 km 4) 250 km

19) The total cost of two goods is Rs. 840. If the cost of the first good is 3/4 of the cost of the second , then the cost of those goods is What is the price ? ①②③④

1) 360, 480 2) 320, 520 3) 480, 360 4) 300, 540

20) A farmer bought 100 quintals of wheat and rice together. Wheat at Rs. 20 /quintal and rice at Rs. 30 /quintal. The total cost was Rs. 2400. So how many quintals of wheat and rice were purchased ? ①②③④

1) 60, 40 2) 50, 50 3) 70, 30 4) 40, 60

9. Quadratic Equations

Important information

❖ **What is a quadratic equation ?**

An equation in one variable in which all the exponents are whole numbers and the highest exponent of the variable is 2 is called Quadratic equation It is said.

General form of quadratic equation:

ax2+bx+c=0ax2+bx+c=0

Here a ≠ 0a□=0, bb and cc are real numbers.

❖ **Root of a quadratic equation**

A quadratic equation has two roots (sometimes both can be the same) 1 .

The value of these two roots can be calculated using the following formula:

x=−b±b2−4ac2ax=2a−b±b2−4ac

Here ±± That means we get two different prices 1 5 .

❖ **Type of values**

If b2−4ac>0 b2−4ac>0 , then two distinct and real roots are obtained.

If b2−4ac=0 b2−4ac=0 , then both roots are equal.

If b2−4ac<0 b2−4ac<0 , then the roots are imaginary 5 .

❖ **Importance**

are used to solve various problems in the fields of science , technology , economics , physics , etc.

Sample questions

1) Equation Find the roots of $x^2-5x+6=0$ $x2-5x+6=0$. ●②③④

1) 2 and 3 2) - 2 and - 3 3) 1 and 6 4) - 1 and - 6

Explanation - Let's solve the quadratic equation x2−5x+6=0 using the factorial method:
x2−2x−3x+6=0
x(x−2)−3(x−2)=0
(x−2)(x−3)=0
So, x=2 x=2 or x=3 x=3.

Exercise

1) Find the root of the equation $x^2 - 9 = 0$. ①②③④

1) ± 3 2) ± 9 3) ± 1 4) ± 2

2) What is the value of the equation $x^2 - 25 = 0$? ①②③④

1) ± 4 2) ± 5 3) ± 6 4) ± 3

3) What is the root of the equation $x^2 + 4x + 4 = 0$? ? ①②③④

1) $x = -2$ 2) $x = 2$ 3) $x = -4$ 4) $x = -1$

4) What is the value of the equation $x^2 + 5x + 6 = 0$? ①②③④

1) $x = -2, -3$ 2) $x = 2, 3$ 3) $x = -1, -6$ 4) $x = 1, -6$

5) What is the root of the equation $x^2 - 7x + 12 = 0$? ①②③④

1) $x = 4, 3$ 2) $x = -4, -3$ 3) $x = 6, 2$ 4) $x = -6, -2$

6) $x^2 - 2x - 15 = 0$ or what is the root of the equation ? ①②③④

1) $x = 3, -5$ 2) $x = -3, 5$ 3) $x = -2, 7$ 4) $x = -1, 15$

7) $x^2 + 6x + 5 = 0$ ①②③④

1) $x = -5, -1$ 2) $x = -2, -3$ 3) $x = 5, 1$ 4) $x = 1, -5$

8) $x^2 + 8x + 16 = 0$ ①②③④

1) $x = -4$ 2) $x = -8$ 3) $x = 4$ 4) $x = 2$

9) $x^2 - 10x + 24 = 0$ ①②③④

1) $x = 6, 4$ 2) $x = -6, -4$ 3) $x = 12, 2$ 4) $x = 5, 5$

10) $x^2 - 11x + 30 = 0$ ①②③④

1) $x = 5, 6$ 2) $x = -5, -6$ 3) $x = 3, 10$ 4) $x = 2, 15$

11) $x^2 + x - 6 = 0$ ①②③④

1) $x = 2, -3$ 2) $x = 3, -2$ 3) $x = -2, -3$ 4) $x = 1, -6$

12) $x^2 - 13x + 40 = 0$ ①②③④

1) $x = 5, 8$ 2) $x = 4, 9$ 3) $x = 7, 6$ 4) $x = 10, 3$

13) $3x^2 - 7x + 2 = 0$ ①②③④

1) $x = 2, 1/3$ 2) $x = 1, 2$ 3) $x = 1/3, 2/3$ 4) $x = -1, 2$

14) $2x^2 - 3x - 2 = 0$ ①②③④

1) $x = 2, -0.5$ 2) $x = 1, 1$ 3) $x = -1, 2$ 4) $x = -2, 1$

15) $2x^2 + 7x + 5 = 0$ ①②③④

1) $x = -1, -2.5$ 2) $x = -1, -2$ 3) $x = -1, -3$ 4) $x = -2, -3$

16) Which of the roots of the equation $5x^2 + 6x - 7 = 0$ is ? ①②③④

1) $x = -7/5, 1$ 2) $x = -1/5, 7$ 3) $x = 1, -7/5$ 4) $x = -7/5, -1$

17) What is the root of the equation $3x^2 - 8x + 4 = 0$ ①②③④

1) $x = 2/3, 2$ 2) $x = -2/3, 2$ 3) $x = 2, 4/3$ 4) $x = -2, 4/3$

18) Which of the roots of the equation $2x^2 + 3x - 5 = 0$ is ? ①②③④

1) $x = 1/2, -5$ 2) $x = 5/2, -1$ 3) $x = -5/2, 1$ 4) $x = -5, 2/3$

19) What is the root of the equation $4x^2 - 12x + 9 = 0$? ①②③④

1) $x = 3/2$ 2) $x = 1$ 3) $x = -3/2$ 4) $x = ½$

20) What is the root of the equation $x^2 + 4x + 4 = 0$? ①②③④

1) $x = 2$ 2) $x = -2$ 3) $x = -4$ 4) $x = -2, 2$

10. Arithmetic category

Important information

❖ **Meaning and identity**

Arithmetic series This is a number series in which the difference (common difference) between two consecutive terms is always the same.

Example: 2, 5, 8, 11, 14, ... where each term increases by 3 .

❖ **Important term**

First term (a): The first number in the series.

Common difference (d): Difference between two consecutive terms

Formula: d= second Position − First Position d= Second Position − First Position

n Th term (T_n): The term in the nth position in the sequence

❖ **Formulas**

Formula – a+(n-1) * d

A =previous term , n =written term , d = difference

Thus , a = previous term d = standard deviation n = hierarchical serial number

The first n hierarchy berries (S_n):

Sn= n2[2a+(n−1)d]Sn=2n[2a+(n−1)d]

Or Sn=n2(a+l)Sn=2n(a+l)

Here , l = nth term (last term) 7

❖ **Uses**

Arithmetic series are used for various mathematical , financial , and business problems , such as saving money , salary increases , etc.

❖ **Summary**

In an arithmetic series, the difference of each term is the same.

T_n and S_n These are the two main formulas , which are used to find any term or sum of terms in a series.

Sample questions

1) The height of students in a school is increasing to 120 cm, 125 cm, 130 cm, 135 cm . What is the 5th term of this range ? ①②●④

1)120 2) 130 3) 140 4) 150

Explanation - Formula – a+(n-1) * d
A=first term, n=number of terms, d= difference
120+ (5-1) * 5
= 120 + 4* 5
= 120 + 20
= 140

2) The price of one volume is increasing by Rs. 10 , Rs . 15, Rs . 20 , Rs. 25. So which is the 8th position ? ①②③④

1) 40 rupees 2) 55 rupees 3) 50 rupees 4) 45 rupees

Explanation - The range of price of a block is 10, 15, 20, 25.... Here the common difference is 5.
Formula – a+(n-1) * d
A=first term, n =second term, d= difference
10+ (8-1) * 5
= 10+7*5
= 10+35
= 45

3) The profit of a company is increasing by 20, 40, 60, 80. What will be the profit of the company in the 15th month ? ①②③④

1) Rs.300 2) Rs.200 3) Rs.150 4) Rs.500

Explanation - The range of profit is 20, 40, 60, 80... Here the common difference is 20.
Formula – a+(n-1) * d
A=first term, n =number of terms, d= difference
20+ (15-1) * 20
= 20 + 14* 20
= 20 + 280
= 300

Exercise

1) 2, 4, 6, 8, ... What is the 5th term of this series ? ? ①②③④

1) 10 2) 12 3) 9 4)14

2) 5, 10, 15, 20, ... What is the 6th term of this series ? ①②③④

1) 30 2) 25 3) 35 4) 40

3) 7, 10, 13, 16, ... What is the 8th term of this series ? ①②③④

1) 25 2) 27 3) 24 4) 26

4) 3, 6, 9, 12, ... What is the 4th term of this series ? ①②③④

1) 15 2) 10 3) 12 4) 9

5) 11, 15, 19, 23, ... What is the 7th term of this series ? ①②③④

1) 30 2) 28 3) 32 4) 29

6) 2, 5, 8, 11, ... What is the 10th term of this series ? ①②③④

1) 29 2) 30 3) 28 4) 27

7) 4, 8, 12, 16, ... What is the 12th term of this series ? ①②③④

1) 46 2) 48 3) 50 4) 44

8) 2, 6, 10, 14, ... What is the 9th term of this series ? ①②③④

1) 34 2) 38 3) 32 4) 36

9) 3, 6, 9, 12, ... What is the 11th term of this series ? ①②③④

1) 33 2) 30 3) 36 4) 32

10) 8, 12, 16, 20, ... What is the 6th term of this series ? ①②③④

1) 20 2) 22 3) 24 4) 26

11) 7, 14, 21, 28, ... What is the 15th term of this series ? ①②③④

1) 98 2) 105 3) 110 4) 120

12) 10, 15, 20, 25, ... What is the 20th term of this series ? ①②③④

1) 100 2) 95 3) 105 4) 110

13) 6, 13, 20, 27, ... What is the 12th term of this series ? ①②③④

1) 76 2) 80 3) 72 4) 74

14) 9, 18, 27, 36, ... What is the 8th term of this series ? ? ①②③④

1) 63 2) 64 3) 62 4) 60

15) 5, 10, 15, 20, ... What is the 25th term of this series ? ①②③④

1) 120 2) 125 3) 130 4) 135

16) The ages of the students in a school are increasing in the following manner: 10, 12, 14, 16... What is the 5th student of this category? Will it be of age ? ①②③④

1) 18 2) 20 3) 22 4) 24

17) In an office , the output of work in a month is increasing by 100 units , 120 units , 140 units... The 6th of this category What month will it be ? ①②③④

1) 180 units 2) 190 units 3) 200 units 4) 210 units

18) In a building , 2, 6, 10, 14, ... Like this, the lights are increasing on each floor. How many are on the 8th floor of this building? Will there be lights ? ①②③④

1) 30 2) 34 3) 38 4) 40

19) The profit of a company is increasing by 1000, 1500, 2000, 2500... What will be the profit of the company in the 15th month ? ①②③④

1) 6000 2) 6500 3) 7000 4) 7500

20) In a game of practice , a player scored 5, 9, 13, 17... in this way. How many runs did that player score in the 25th innings? Done ? ①②③④

1) 95 2) 98 3) 100 4) 105

11. Average

Important information

❖ **What is average ?**

" Average" That is, the sum of all the given numbers is stored and The answer that is obtained when divided **by the number of numbers** (i.e. how many numbers are considered) is **Average** There is.

Average formulas for a specific category

Category	Formula	Usage/Example
n natural numbers	**(n+1) ÷ 2**	**Average of numbers from 1 to n**
n even numbers	**n+1**	**2, 4, 6, ..., 2n**
n odd numbers	**n**	**1, 3, 5, ..., 2n-1**

Sample questions

1) The following are five numbers : 12, 13, 14, 15, 16. The average of these numbers is How much? ①●③④

1) 17 2) 14 3) 19 4) 20

Explanation - Average = The average of a sequence of natural numbers is the middle number.

2) The average of the mathematics marks of 10 students in a class is 72. Adding the marks of a new student, the average becomes 74. How many marks did the new student score ? ● ①②③④

1) 94 2) 96 3) 114 4) 100

Explanation - Total of 20 students = 72 × 10 = 720.
New average is 74 and now there are 21 students, so total = 74 × 11 = 814
New student's marks = 814 − 1440 = 720

3) The average height of 8 people in a group is 165 cm. The average height of 12 people in the other group is 170 cm. What is the average height of both the groups together ? ●②③④

1) 168 cm. 2) 167 cm. 3) 166 sec. I. 4) 169 cm.

Explanation - Total people = 8 + 12 = 20.
Total height = 165×8 + 170×12 = 1320 + 2040 = 3360.
Average = 3360 ÷ 20 = 168 cm.

Exercise

1) The average of 8 numbers is 20. If one number is omitted, the new average becomes 18. So what is the omitted number ? ①②③④

1) 18 2) 22 3) 34 4) 28

2) The average of 5 consecutive even numbers is 24. What is the largest number ? ①②③④

1) 26 2) 28 3) 30 4) 32

3) The average weight of 30 children in a class is 45 kg. If the weight of the teacher is included, the average increases by 1 kg. The teacher's How much does it weigh ? ①②③④

1) 70 2) 75 3) 76 4) 80.

4) The average of 10 numbers is 50. What is the new average if 5 is obtained in each number ? ?

1) 50 2) 55 3) 60 4) 65. ①②③④

5) Rahul scored 75, 82, and 90 marks in 3 exams . How many marks should he get in the fourth exam so that his average is 85? Will it happen ? ①②③④

1) 93 2) 95 3) 97 4) 99

6) The average of the ages of A and B is 20 years. If C 's age is included, the average becomes 22 years. The ages of A, B, and C are What is the total ? ①②③④

1) 66 2) 68 3) 70 4) 72

7) The average height of 25 students is 160 cm. With 5 new students the average was 162 cm. The average height of the new students is How much ? ①②③④

1) 170 2) 172 3) 174 4) 176

8) The average salary of 20 employees in a company is ₹4000 . If the average salary of 5 employees is ₹4000 , then the remaining What is the average salary of employees ? ①②③④

1) 2000 2) 4000 3) 5000 4) 6000

9. Question : The average of 12 numbers is 45. Of these, 6 If the number is omitted, the average of the remaining numbers is 42. The omitted 6 Numbers How much is the average ? ①②③④

1) 50 2) 52 3) 48 4) 56

10. Question : The average of 10 numbers is 60. If the average of the first 6 numbers is 55 and the average of the last 5 numbers is 65 , What is the sixth number ? ①②③④

1) 50 2) 55 3) 60 4) 65

11. Question : The average age of 4 members in a family is 30 years. If a child is born in the family, the average age becomes 25 years. The age of the child is How much ? ①②③④

1) 1 2) 2 3) 5 4) 10

12. Question : The average of 11 players of a cricket team is 28 runs. If the runs of the captain are excluded, the average becomes 26 . How many runs did the captain score ? ①②③④

1) 50 2) 48 3) 54 4) 56

The average age of A, B, and C is 24 years. If A is twice the age of B and C is thrice the age of A , then B 's How old are you ? ①②③④

1) 8 2) 14 3) 16 4) 18

14) The average height of 20 students is 160 cm. If the average height of 5 students is 170 cm , then the average height of the entire group is How much ? ①②③④

1) 162 2) 164 3) 166 4) 168

15) The average of 50 numbers is 40. If the average of 30 of these numbers is 35 and the average of the remaining 20 numbers is 50 , then the total How much is the average ? ①②③④

1) 41 2) 42 3) 44 4) 46

16) If 5 liters of water is mixed with 25 liters of milk , what is the percentage of milk in the mixture ? ? ①②③④

1) 80% 2) 83.33% 3) 85% 4) 90%

17) The average of the salaries of A and B is ₹50,000 . If A 's salary is ₹10,000 more than B's , then what is B 's salary ? ①②③④

1) 45,000 2) 47,000 3) 48,000 4) 50,000

18) The average marks of 15 students are 80. If the marks of 3 students are changed to 95, 85, and 75 , what is the new average ?

1) 81 2) 82 3) 83 4) 84 ①②③④

19) The average of 100 numbers is 50. What is the new average if each number is increased by 2?

1) 50 2) 52 3) 54 4) 55 ①②③④

20) The average of 8 numbers is 12. What is the new average if 3 numbers 15, 18, and 21 are added to it ? ①②③④

1) 13.63 2) 14.22 3) 15 4) 16

12. Speed, time , work

Important information

❖ **Basic concepts**

Time : The time taken to complete a task.

Work : A unit to be completed (such as: painting a room , filling a tank).

Speed/efficiency : How much work a person/machine does in a unit of time.

❖ **Important formulas**

Work in a day = 1 / Days taken to complete

If ' A ' alone does the work in 20 days , then ' A ' 's work in one day = 1/20

❖ **Efficiency of working together**

If ' A ' completes a work in 20 days and ' B ' in 30 days , then together they will complete the work in one day:

1 / 20+1 / 30=3+2 / 60=5 / 60=1 /12

That means both of them together complete the work in 12 days.

Sample questions

1) ' A' completes a work in 6 days. 'B' takes 12 days to complete the same work , then in how many days will both of them complete the work together ? ①●③④

1) 8 2) 4 3) 5 4) 10

Explanation - 'A' takes 20 days to do a piece of work and 'B' takes 30 days to do the same work. Accordingly, 'A' does 1/20 x of the work in a day and 'B' does 1/3 x of the work in a day:: Together they do 1/6 + 1/12 = 2/12 + 1/12 = 3/12 of the work in a day. Together they will complete the work in X= 12/3=4 days. Answer – 4 days

2) 15 children complete a piece of work in 20 days. If 3 children do as much work as 2 men , in how many days will 20 men complete the same piece of work ? ①②③●

1) 15 2) 8 3) 12 4) 10

Explanation - 3 boys = 2 men i.e. 15 boys = 10 men, hence 10 men will do the work in 20 days.: 20 men will do the work in 10 days.

3) 20 workers work 6 hours a day and complete a job in 12 days . In how many days will 10 workers work 12 hours a day and complete the same job ? ●②③④

1) 12 2) 8 3) 10 4) 14

Explanation - Information part = 20 × 6 × 12 = 20 × 9 × x Accordingly X = 20 × 6 × 12/10 × 12 = 12

Exercise

1) A completes a piece of work in 15 days and B completes the same piece of work in 30 days. How many days will it take if both of them work together ? ①②③④

1) 15 2) 8 3) 10 4) 12

2) A and B complete a piece of work in 12 days. If A alone can do it in 30 days , then in how many days will B alone do it ? ①②③④

1) 15 2) 20 3) 25 4) 30

3) 20 workers build a wall in 18 days. How many workers will be required to complete the work in 24 days ? ①②③④

1) 12 2) 15 3) 18 4) 20

4) A, B, and C do a piece of work in 10, 12, and 15 days respectively. How many days will it take if all three of them work together ? ①②③④

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

5) There are two taps in a tank. The first tap fills it in 6 hours and the second one empties it in 9 hours. If both the taps are opened simultaneously, how much time will it take to fill the tank ?

1) 12 2) 18 3) 24 4) 30 ①②③④

6) A does a piece of work in 20 days. He works for 5 days and leaves. B completes the remaining work in 15 days. In how many days will B alone do the entire work ? ①②③④

1) 25 2) 30 3) 35 4) 40

7) 10 men do a piece of work in 8 days. How many men will be required to complete the same work in 4 days ? ①②③④

1) 15 2) 20 3) 25 4) 30

8) A is twice as efficient as B. If B does a piece of work in 18 days , then in how many days will A and B together do it ? ①②③④

1) 4 2) 6 3) 8 4) 10

9) 1/5 of a work is completed in 10 days. How many days will it take to complete the remaining work ? ①②③④

1) 30 2) 40 3) 20 4) 25

10) A and B do a piece of work in 8 days. B and C do the same work in 12 days. A, B, and C together do it in 6 days. So in how many days will C alone do it ? ①②③④

1) 24 2) 36 3) 48 4) 60

11) A and B can complete a piece of work in 12 days , B and C can complete the same piece of work in 15 days , and A and C can complete it in 20 days. How many days will it take if all three of them work together ? ①②③④

1) 8 2) 10 3) 12 4) 15

12) Tap A fills the tank in 10 hours , tap B fills it in 12 hours , and tap C empties it in 15 hours. If all three taps are started simultaneously , how much time will it take to fill the tank ? ①②③④

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

13) 25 Workers complete a piece of work in 30 days . How many days will it take 30 workers to complete the same piece of work? ①②③④

1) 20 2) 25 3) 30 4) 35

14) A is twice as efficient as B. If both of them work together, it takes 14 days. Then in how many days will B do it alone ? ①②③④

1) 21 2) 42 3) 56 4) 63

15) 8 workers complete a piece of work in 15 days. How many workers will be required to complete the same piece of work in 10 days ? ①②③④

1) 12 2) 10 3) 18 4) 20

13. Speed, Time and Distance

Important information

❖ **Distance –** It shows how far away objects are and is measured in various units.

It tells us how far away the reality is from us. It is numerical in nature with its unit. Time and

The most common units used in distance questions are kilometers and meters.

❖ **Speed –** Speed is a measure of the change in the position of something with respect to time. Time gap

After dividing, we can calculate the speed. The common units of speed are kilometers per hour (km/h) and meters per second (m/s).

Yes.

❖ **Time –** Time can be defined in hours , minutes, and seconds.

The basic formulas for time and distance are given below.

Distance = Speed x Time Time = Distance / Speed Speed = Distance / Time

Average speed = Total distance covered / Total time taken

Sample questions

1) A taxi travels for 2 hours at a speed of 80 km/h . Then she travels for 1 hour at a speed of 50 km/h . So how much distance did she cover in total ? ①②●④

1) 140 km 2) 150 km 3) 210 km 4) 170 km

Explanation – Distance covered in first 2 hours = 80 km/h * 2 hours = 160 km
Distance covered in next 1 hour = 60 km/h * 1 hour = 50 km
Total distance = 160 km + 50 km = 210 km

2) Two trains are coming from opposite directions on a track. The first train is 100 km/h and the other 80 km/h. The distance between them is 900 km/h. km. In how many hours will they meet each other ? ①②③●

1) 2 hours 2) 3 hours 3) 4 hours 4) 5 hours

Explanation - Speed = 100+80 = 180 km/h; Time = 900 ÷ 180 = 5 hours.

3) A person reaches from one place to another in 5 hours. If he had increased his speed by 10 km/h, he would have reached in 4 hours. What is the original speed ? ①②③●

1) 20 km/h 2) 25 km/h 3) 30 km/h 4) 40 km/h

Explanation - Original speed = v, distance = 5v.
New speed = v+10, time = 4 hours ⇒ distance = 4(v+10).
⇒ 5v = 4v + 40 ⇒ v = 40 km/h

Exercise

1) A car travels at 60 km/h. How long will it take to cover a distance of 300 km ? ①②③④

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

2) A train crosses a platform 120 m long in 20 seconds. If the speed of the train is 18 m/s , what is the length of the platform ?

1) 200 m 2) 240 m 3) 300 m 4) 360 m ①②③④

3) A boat moves at a speed of 12 km/hr in still water. If the speed of the current is 3 km/hr , how long will it take to cover a distance of 45 km upstream ? ①②③④

1) 3 hours 2) 4 hours 3) 5 hours 4) 6 hours

4) Two cars are running towards each other at speeds of 50 km/h and 70 km/h respectively. If the distance between them is 360 km , after how much time will they meet ? ①②③④

1) 2 hours 2) 3 hours 3) 4 hours 4) 5 hours

5) A cyclist travels at a speed of 15 km/h. How many minutes will it take him to cover a distance of 45 km ? ①②③④

1) 120 2) 180 3) 200 4) 240

6) A 200 m long train is running at a speed of 40 km/h. In how much time will it cross a 400 m long bridge ? ①②③④

1) 54 seconds 2) 60 seconds 3) 72 seconds 4) 80 seconds.

7) The distance between two stations A and B is 560 km. Two trains start simultaneously and run at speeds of 60 km/hr and 80 km/hr respectively. After how much time will they meet ?

1) 3 hours 2) 4 hours 3) 5 hours 4) 6 hours ①②③④

8) The speed of a boat against the current is 8 km/hr and the speed with the current is 12 km/hr. What is the speed of the current ? ①②③④

1) 2 km/h 2) 3 km/h 3) 4 km/h 4) 5 km/h

9) A man walks at a speed of 5 km/hr and runs at a speed of 10 km/hr. He took 4 hours to cover a distance of 25 km , then how many km did he run ? ①②③④

1) 10 2) 15 3) 20 4) 25

10) A train running at a speed of 72 km/hr crosses a 250 m long platform in 22.5 seconds. What is the length of the train ? ①②③④

1) 200 m 2) 250 m 3) 300 m 4) 350 m

Two cars A and B are running in the same direction at speeds of 40 km/h and 60 km/h respectively. If B is 100 km behind A , after how much time will B overtake A ? ①②③④

1) 2 hours 2) 3 hours 3) 4 hours 4) 5 hours

12) A car takes 10 hours to travel 600 km . If some distance is covered at a speed of 60 km/h and the rest at a speed of 80 km/h , how much distance is covered at a speed of 80 km/h ? ①②③④

1) 240 km 2) 300 km 3) 360 km 4) 400 km

13) Two friends A and B run on a circular track of circumference 400 m at speeds of 5 m/s and 3 m/s respectively. If they start running in the same direction from the same point , how much time does it take for A to overtake B for the first time ? ①②③④

1) 200 seconds 2) 250 seconds 3) 300 seconds 4) 350 seconds

14) A car travels half the distance of 40 km . / hours and the remaining half distance is 60 km . / The hour cuts quickly. The average speed of the entire journey How much ? ①②③④

1) 48 km/h 2) 50 km/h 3) 52 km/h 4) 55 km/h

15) A train crosses a pole in 30 seconds while running at a speed of 108 km/h. What is the length of the train ? ①②③④

1) 900 m 2) 950 m 3) 1000 m 4) 1050 m

16) A boat travels 24 km downstream in 2 hours and 18 km upstream in 3 hours . What is the speed of the boat in still water? ? ①②③④

1) 8 km/h 2) km/h 3) 12 km/h 4) 15 km/h

17) A train 200 meters long runs at a speed of 54 km/h. In what time will she cross the 400 meter long bridge ? ①②③④

1) 40 seconds 2) 45 seconds 3) 50 seconds 4) 55 seconds

18) A man travels 300 km. If he had taken 5 hours more , his speed would have decreased by 10 km/hr. What is the man's original speed? ? ①②③④

1) 20 km/h 2) 25 km/h 3) 30 km/h 4) 35 km/h

19) Two trains are 100 m and 150 m long respectively. They are running towards each other at speeds of 54 km/h and 36 km/h. How much time will it take to completely pass each other ?

1) 10 seconds 2) 12 seconds 3) 15 seconds 4) 18 seconds ①②③④

20) A person reaches his office 10 minutes late by walking at a speed of 5 km/hr and reaches his office 5 minutes early by walking at a speed of 10 km/hr . What is the distance between home and office ? ①②③④

1) 5 km 2) 7.5 km 3) 10 km 4) 12.5 km

14. Simple interest and compound interest

Important information

❖ **Formulas :**

Simple interest : P×R×T100100P×R×T.

Compound interest : A=P×(1+R100)TA=P×(1+100R)T, CI=A−PCI=A−P.

Difference (CI - SI): P×R2×T10021002P×R2×T (for 2 years).

Semi-annual compounding : Rate = R22R, Term = 2T2T.

Sample questions

1) Rahul keeps ₹50,000 in a bank for 3 years at 6% compound interest per annum. How much interest will he get ? ①●③④

1) ₹8,000 2) ₹9,000 3) ₹10,000 4) ₹12,000

Explanation –

Simple interest = 50,000×6×3100=9,00,000100=₹9,00010050,000×6×3=1009,00,000=₹9,000.

2) Seema invested ₹20,000 for 2 years at 8% compounded annually. How much will she get back?

1) ₹23,200 2) ₹23,328 3) ₹24,000 4) ₹25,000 ①●③④

Explanation –

Ras = 20,000×(1+8100)2=20,000×1.1664=₹23,32820,000×(1+1008)2=20,000×1.1664=₹23,328.

3) What is the difference between simple interest and compound interest on ₹10,000 at 10 % per annum for 3 years ? ●②③④

1) ₹310 2) ₹330 3) ₹350 4) ₹400

Explanation – Simple interest = 10,000×10×3100=₹3,00010010,000×10×3=₹3,000.
Compound interest = 10,000×(1.1)3−10,000=₹3,31010,000×(1.1)3−10,000=₹3,310.
Difference = ₹3,310 - ₹3,000 = ₹310.

Exercise

1) on ₹1,000 at 5% per annum for 2 years ? ①②③④

1) ₹100 2) ₹150 3) ₹200 4) ₹250

2) What is the compound interest on ₹2,000 at 10% per annum for 2 years ? ①②③④

1) ₹420 2) ₹440 3) ₹442 4) ₹450

3. A sum of money earned ₹1,200 as simple interest in 3 years . What is the principal if the interest rate is 4% ? ①②③④

1) ₹8,000 2) ₹10,000 3) ₹12,000 4) ₹15,000

Find the difference between the simple interest and compound interest on ₹5,000 in 2 years (at the rate of 8% per annum). ①②③④

1) ₹32 2) ₹40 3) ₹64 4) ₹80

5. What is the interest on ₹10,000 compounded semi-annually at 10% for 1 year ? ①②③④

1) ₹1,000 2) ₹1,025 3) ₹1,050 4) ₹1,100

6. The compound interest on a sum of money in 3 years is ₹993 . If the interest rate is 10% , what is the principal ? ①②③④

1) ₹3,000 2) ₹3,500 3) ₹4,000 4) ₹4,500

7. The simple interest on a sum of money in 2 years is ₹1,600 and the compound interest is ₹1,664 . What is the interest rate ? ①②③④

1) 8% 2) 10% 3) 12% 4) 15%

What is the compound interest on ₹20,000 for 3 years at 12% per annum ? ①②③④

1) ₹8,098.56 2) ₹9,000 3) ₹10,000 4) ₹12,000

9. The simple interest on a sum of money in 5 years is ₹2,500 . If the interest rate is increased by 2% , the new simple interest becomes ₹3,500 . Principal How much ? ①②③④

1) ₹10,000 2) ₹12,000 3) ₹15,000 4) ₹20,000

What is the difference between compound interest and simple interest on ₹ 15,000 at 10% per annum for 2 years ? ①②③④

1) ₹150 2) ₹200 3) ₹250 4) ₹300

11. Radha deposited ₹25,000 in a bank for 3 years at 8% compound interest. How much will she get ? ①②③④

1) ₹31,492 2) ₹32,500 3) ₹35,000 4) ₹40,000

12. The compound interest on a sum of money in 2 years is ₹1,650 and the simple interest is ₹1,500 . What is the rate of interest ? ①②③④

1) 10% 2) 15% 3) 20% 4) 25%

13. What is the interest on ₹50,000 compounded semi-annually at 15% per annum for 3 years ?

1) ₹26,250 2) ₹28,000 3) ₹30,000 4) ₹32,250 ①②③④

14. The simple interest on a sum of money at 4% per annum for 2 years is ₹800 . The compound interest on the same sum at 5% per annum for 3 years is How much ? ①②③④

1) ₹1,215 2) ₹1,500 3) ₹1,800 4) ₹2,000

What is the difference between simple interest and compound interest on ₹ 12,000 at 10% per annum for 2 years ? ①②③④

1) ₹120 2) ₹240 3) ₹360 4) ₹480

on ₹X at 15% per annum for 2 years is ₹9,000 . What is the compound interest on the same amount at the same rate ? ①②③④

1) ₹9,000 2) ₹10,125 3) ₹11,250 4) ₹12,500

17. The simple interest on a sum of money in 2 years is ₹4,000 and the compound interest is ₹4,400 . Find the principal and the rate of interest. ①②③④

1) ₹20,000 and 10% 2) ₹25,000 and 8% 3) ₹30,000 and 10% 4) ₹40,000 and 5%

18) How much is the interest on ₹15,000 compounded semi-annually at 12% per annum for 1.5 years ? ①②③④

1) ₹2,850 2) ₹2,865 3) ₹3,000 4) ₹3,200

the compound interest on ₹ 25,000 in 2 years becomes ₹5,100 , what is the interest rate ?

1) 8% 2) 10% 3) 12% 4) 15% ①②③④

What is the difference between simple interest and compound interest on ₹15,000 at 10 % for 2 years ? ①②③④

1) ₹150 2) ₹200 3) ₹250 4) ₹300

15. Profit – Loss

Important information

In business or transaction, there is a loss or profit when selling something. These are two important words – Purchase price and Selling price

❖ **Important Formulas :**

Profit = Selling Price (SP) – cost price (CP) .

Loss = cost price (CP) - Selling Price (SP)

Profit % = (Profit / cost price) × 100

Loss % = (Loss / cost price) × 100

Selling Price (SP) = [(100 + Profit%) / 100] × cost price (CP)

Selling Price (SP) = [(100 - Loss%) / 100] × cost price (CP)

cost price (CP) = [100 / (100 + Profit%)] × Selling Price (SP) (for profit)

cost price (CP) = [100 / (100 - Loss%)] × Selling Price (SP) (for loss)

Sample questions

1) An item was sold for Rs 500 and a profit of 25% was made. What was the purchase price of that item ? ①●③④

1) 375 Rs. 2) 400 Rs. 3) 425 Rs. 4) 450 Rs.

Explanation – Selling Price = Purchase Price + 25% Profit
500 = Purchase Price + 0.25× Purchase Price
500 = 1.25× Purchase Price
Purchase Price = 500/1.25 = 400 Rs.

2) A shopkeeper sells rice worth Rs 80 per kg at Rs 90 per kg. What is his profit percentage ?

1) 10% 2) 12.5% 3) 15% 4) 18% ①●③④

Explanation - Profit = 90 - 80 = Rs. 10
Profit % = (Profit / Purchase Price) × 100 = (10 / 80) × 100 = 12.5%

3) A merchant sells two items for Rs 6000 each. He makes a profit of 20% on one and a loss of 20% on the other. So, how much profit or loss did he make in the total transaction ? ①●③④

1) 400 Rs. Profit 2) 500 Rs. Loss 3) 600 Rs. Loss 4) No profit No loss

Explanation – First Item – 20% Profit → Selling Price = 1.2× Purchase Price → 6000 = 1.2× Purchase Price → Purchase Price = 5000 Rs.
Second item - 20% loss → Selling Price = 0.8× Purchase Price → 6000 = 0.8× Purchase Price → Purchase Price = 7500 Rs.
Total Purchase Price = 5000 + 7500 = 12,500 Rs.
Total Selling Price = 6000 + 6000 = 12,000 Rs.
Loss = 12,500 - 12,000 = 500 Rs.

Exercise

1) If an item is sold for ₹500, there is a profit of 20% . So what is its purchase price ? ①②③④

1) ₹400 2) ₹416.67 3) ₹450 4) ₹480

2) If there is a loss of 25% on an item worth ₹800 , what is the selling price ? ①②③④

1) ₹600 2) ₹650 3) ₹700 4) ₹750

3) The cost of a shirt is ₹300 . At what price should it be sold to earn 15% profit ? ①②③④

1) ₹345 2) ₹350 3) ₹355 4) ₹360

a profit of 20% is made on an item sold for ₹1,200 , what is the purchase price ? ①②③④

1) ₹900 2) ₹1,000 3) ₹1,100 4) ₹1,050

5) A shopkeeper sells an item purchased for ₹400 for ₹360 . What is the percentage loss ?

1) 10% 2) 12% 3) 15% 4) 20% ①②③④

6) A shopkeeper sells goods at a profit of 20% but uses a weight of 900 grams instead of 1 kg . What is his actual profit percentage ? ①②③④

1) 30% 2) 33.33% 3) 40% 4) 44.44%

7) The printed price of an item is ₹1,500 . The shopkeeper gives two consecutive discounts of 10% and 20% . What is the final selling price of the item? ? ①②③④

1) ₹1,080 2) ₹1,100 3) ₹1,200 4) ₹1,250

8) Two items A and B were sold for ₹600 each . A made a profit of 20% and B made a loss of 20 % . Total Profit / Loss What is the percentage ? ①②③④

1) 4% loss 2) 4% profit 3) 5% loss 4) No profit or loss

9) The printed price of an item is 50% more than the purchase price. What is the profit percentage if a 10% discount is given ? ①②③④

1) 25% 2) 30% 3) 35% 4) 40%

10) A shopkeeper gives 20% discount and still makes 20% profit. What percentage is the printed price higher than the purchase price ? ①②③④

1) 40% 2) 50% 3) 60% 4) 70%

11) A trader purchased 10 kg of sugar at ₹25/ kg and 15 kg at ₹30/ kg. The mixture cost ₹35/ What is the profit percentage if it is sold at a low price ? ①②③④

1) 20% 2) 25% 3) 30% 4) 40%

12) A sold an article to B at a profit of 20% . B sold it to C at a loss of 10% . If C paid ₹1,188 , then A 's purchase price How much ? ①②③④

1) ₹1,000 2) ₹1,100 3) ₹1,200 4) ₹1,300

13) A shopkeeper gives 10% discount and makes 8% profit. If the discount is 15% , what is the profit/loss percentage ? ①②③④

1) 2% profit 2) 2% loss 3) 3% profit 4) 3% loss

14) A sold an article to B at a profit of 20% . B sold it to C at a loss of 10% for ₹220 . So what is the purchase price of A ? ①②③④

1) ₹200 2) ₹250 3) ₹275 4) ₹300

If two consecutive discounts of 15% and 20% are given on an item priced at ₹2,000 , what is the final selling price ?

1) ₹1,300 2) ₹1,360 3) ₹1,400 4) ₹1,500 ①②③④

16) A shopkeeper uses 900 grams instead of 1 kg and sells at the purchase price. What is his actual profit percentage ?

1) 10% 2) 11.11% 3) 12.5% 4) 15% ①②③④

17) Two items were sold for ₹5,000 each . 20% profit on one , 20% loss on the other . What is the total profit/loss percentage ? ①②③④

1) 4% loss 2) 4% profit 3) 5% loss 4) Neither profit nor loss

18) A, B, and C sell goods at a profit of 10%, 20%, and 30% respectively . If the selling price of C is ₹2,860 , then A 's What is the purchase price ? ①②③④

1) ₹1,500 2) ₹1,800 3) ₹2,000 4) ₹2,200

19) A shopkeeper keeps the printed price 60% higher than the purchase price to make a profit of 25% . If a discount of 10% is given , What is the actual profit % ? ①②③④

1) 20% 2) 25% 3) 30% 4) 35%

16. Statistics

Important information

❖ **What is statistics ?**

Statistics That is, the method of collecting , analyzing , presenting, and interpreting data . Data is information obtained about something.

Measurements or observations.

Noun	Meaning
Mean	Average of all numbers
Median	The number in the middle
Multiplier (Mode)	Most frequent number
Grouped Data	Information divided into categories
Deviation	Distance from the center
Frequency	Number of occurrences of an element

❖ **2. Measures of Central Tendency**

A. Mean

Middle = All Observations Totals/ Observations Number

B. Median

Arrange the data in ascending/descending order.

odd number : Middle value

Even number : Example of the middle of two middles
: Median of 3, 5, 7, 9 = 5+72=625+7=6

C. Polymer (Mode)

The most frequently occurring value.
Example : Multiple of 2, 3, 3, 5 = 3

Sample questions

1) 1) What is the mean of the numbers 5, 8, 12, 6, 9 ? ①●③④

1) 7 2) 8 3) 9 4) 10

Explanation – Median = (5 + 8 + 12 + 6 + 9) / 5 = 40 / 5 = 8

2) Median of data 3, 5, 7, 7, 9, 11 , 13 ? ●②③④

1) 7 2) 8 3) 9 4) 10

Explanation - The data is in order. Since there are 7 numbers in total, median = fourth

3) What is the mode of data 4, 6, 6, 8, 10, 12, 12, 12, 14 ? ①②●④

1) 6 2) 8 3) 12 4) 14

Explanation - The number 12 occurs the most (3 times), so the multiplier = 12

Exercise

1) The heights (in centimeters) of 10 students are as follows: 150, 160, 155, 165, 170, 180, 175, 160, 150, 155. What is the average height of these students ? ①②③④

1) 160 2) 165 3) 155 4) 170

2) The ages of 5 students in a class are as follows: 12, 14, 13, 15, 13. The age range of this Median What is your age ? ①②③④

1) 12 2) 13 3) 14 4) 15

3) Question : The salaries of 6 employees of a company are as follows: 20000, 25000, 18000, 22000, 24000, 26000 . These employees Median What is the salary ? ①②③④

1) 22000 2) 24000 3) 23000 4) 25000

4) The chromosomes of 5 students are as follows: 80, 70, 90, 60, 85. The number of these chromosomes What is Standard Deviation ? ①②③④

1) 10 2) 12 3) 15 4) 20

5) The ages of the students in a class are as follows: 15, 18, 14, 16, 15, 17, 16, 15. What is the range in years ? ①②③④

1) 3 2) 5 3) 4 4) 6

6) The distribution (frequency) of marks of 10 students in a class is as follows: Marks: 10, 20, 30, 40 Distribution: 2, 3, 4, 1 of these students Middle What is the score ? ①②③④

1) 25 2) 28 3) 30 4) 26

7) The marks of the students in a class are 10, 12, 14, 16, 18, 20, 22, 24, 26, 28. The marks of these students are Square mean (Quartile) What is deviation ? ①②③④

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

8) The marks of students in a class are 30, 40, 50, 60, 70, 80, 90, 100, 110, 120. These students What is the median score ? ①②③④

1) 65 2) 70 3) 75 4) 80

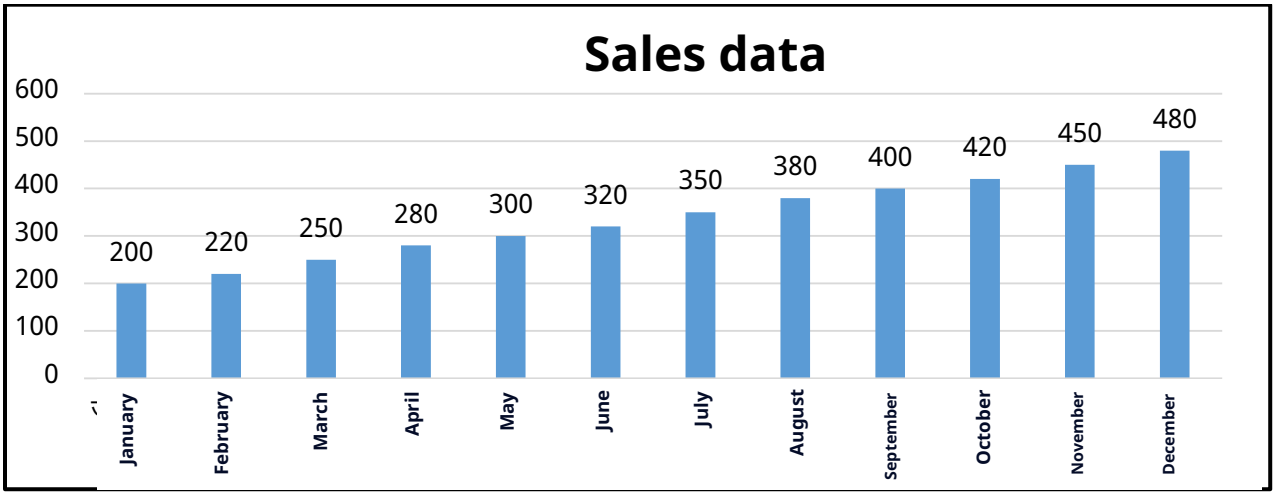
9) Monthly sales of a businessman The numbers are as follows: 5000, 7000, 6000, 8000, 4000. This sale Median What is it ? ①②③④

1) ₹7000 2) ₹6000 3) ₹6500 4) ₹5500

10) The distribution of salaries of 7 employees of a company is as follows: Salary: ₹20000, ₹30000, ₹40000, ₹50000, ₹60000 Distribution: 2, 1, 3, 1, 0 employees Median salary What is it ?

1) ₹40000 2) ₹35000 3) ₹30000 4) ₹45000 ①②③④

For questions 11 to 15 – Choose the answers to the questions below.



11) Which month has the highest sales? ①②③④

1) January 2) June 3) July 4) December

12) Which month has the lowest sales? ①②③④

1) January 2) June 3) July 4) December

13) After which month did sales decline the most? ①②③④

1) August 2) November 3) June 4) None

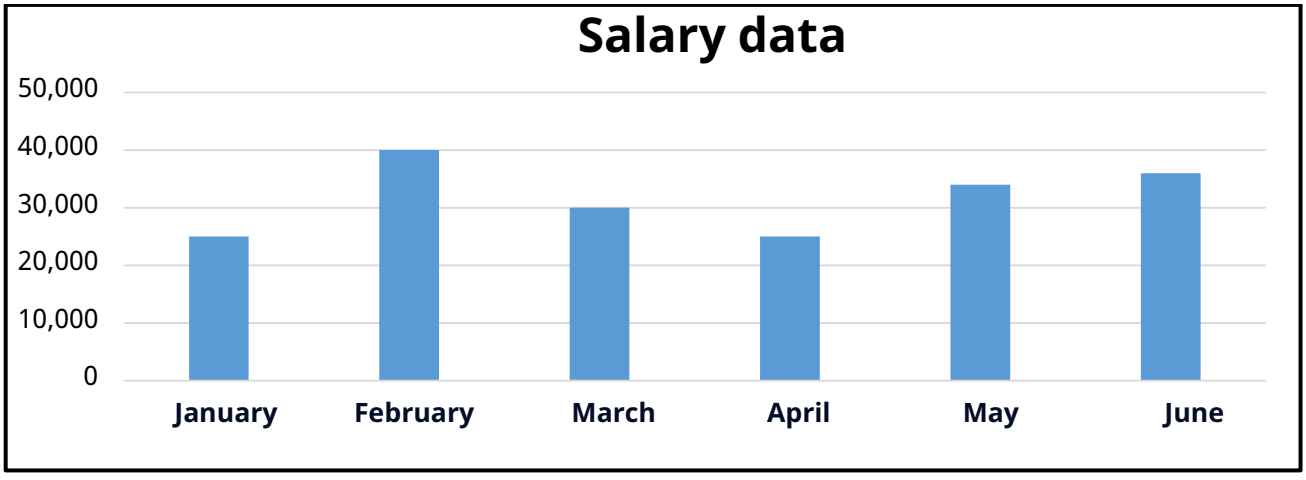
14) Unit sales have been declining steadily. ①②③④

1) True 2) False 3) Cannot be said 4) None of these

15) Which two months have the same sales? ①②③④

1) January, July 2) December , January 3) June, November 4) None

For questions 16 to 20 – Choose the answers to the following questions,



16) Which month's salary is 40000? ①②③④

1) January 2) June 3) February 4) December

17) Which month has the lowest salary? ①②③④

1) January 2) June 3) March 4) April

18) After which month did the salary decrease the most in the following month? ①②③④

1) February 2) January 3) June 4) None

19) Which month saw the highest increase in salary the following month? ①②③④

1) April 2) June 3) March 4) January

20) Which two months' salary is the same? ①②③④

1) January, February 2) April , May 3) January , April 4) None

17. Circle

Important information

Circumference of a circle = $2\pi r = \pi d$

Area of a circle = πr^2

(Here π = 3.14 or 22/7, as asked)

Sample questions

1) If the area is 962.5 cm^2 If so , what is the radius ? (π = 3.14) ①②③④

1) 17.5 cm 2) 18 cm 3) 16.5 cm 4) 15.5 cm

Explanation - $\pi r^2 = 962.5 \Rightarrow r^2 = 306.05 \Rightarrow r \approx 17.5$

Exercise

1) What is the area of a circle with radius 4 cm ? ①②③④

1) 50.24 cm^2 2) 52.24 cm^2 3) 51.12 cm^2 4) 48.14 cm^2

2) Area of the circle is 113.04 cm^2 If so , what is the diameter ? ①②③④

1) 10 cm 2) 12 cm 3) 6 cm 4) 8 cm

3) If the diameter is 20 m , then the area of the circle is? (π = 3.14) ①②③④

1) 400 m^2 2) 314 m^2 3) 314.15 m^2 4) 314.0 m^2

4) If the radius is 0.5 m, what is the area of the circle ? ①②③④

1) 0.785 m^2 2) 0.85 m^2 3) 0.65 m^2 4) 1.0 m^2

5) If the area of a circle is 706.86 , then what is the radius ? (π = 3.14) ①②③④

1) 14 cm 2) 15 cm 3) 16 cm 4) 13 cm

6) The radius of a circular garden is 14 meters. What is the area of the garden ? ①②③④

1) 616 m^2 2) 650 m^2 3) 700 m^2 4) 784 m^2

7) The diameter of a large plate is 28 cm. What is its area ? ①②③④

1) 484 cm^2 2) 615 cm^2 3) 616 cm^2 4) 628 cm^2

8) The area of the top of a round table is 706.86 m^2 . is. So what will be its radius ? (π = 3.14)

1) 14 m 2) 15 m 3) 16 m 4) 17 m ①②③④

9) The diameter of a round well is 4 meters. What is its area as seen from above the well ?

(π = 3.14) ①②③④

1) 12.56 m^2 2) 10.25 m^2 3) 9.42 m^2 4) 14.12 m^2

10) The area of the shell of a round mussel is 201.06 cm^2 . is. What will be its radius ? (π = 3.14)

1) 9 cm 2) 8 cm 3) 7 cm 4) 6 cm ①②③④

11) The diameter of a round pit is 2.8 meters. What will be its area ? (π = 22/7) ①②③④

1) 6.16 m^2 2) 5.64 m^2 3) 6.15 m^2 4) 5.75 m^2

12) The diameter of a circular film strip is 20 cm. What is its area ? (π = 3.14) ①②③④

1) 314 cm^2 2) 300 cm^2 3) 320 cm^2 4) 295 cm^2

13) The radius of a circular playground is 21 meters. What is its area ? ①②③④

1) 1386 m^2 2) 1444 m^2 3) 1366 m^2 4) 1331 m^2

14) A round glass board is to be made. If the area is 490.62 cm^2 If so , what is the radius ?

(π = 3.14) ①②③④

1) 12.5 cm 2) 12 cm 3) 11.5 cm 4) 11 cm

15) If the radius of a circle is doubled, how many times will the area increase ? ①②③④

1) 2 times 2) 3 times 3) 4 times 4) 8 times

16) A solar panel is to be installed on a circular elevation. If its diameter is 1.4 meters, what is its area ? ①②③④

1) 1.54 m^2 2) 1.6 m^2 3) 1.45 m^2 4) s1.25 m^2

17) The area of the top of a round cupboard is 78.5 cm^2 . is. So what will be its diameter ? (π = 3.14) ①②③④

1) 10 cm 2) 9 cm 3) 8 cm 4) 7 cm

18) The radius of a round clock is 3.5 cm. What is its area ? ①②③④

1) 38.5 cm^2 2) 39 cm^2 3) 37.8 cm^2 4) 36 cm^2

19) The area of the shadow of a round tree is 346.36 m^2 . How many people can stand under its shadow (each person 0.5 m^2 It takes up space) ? ①②③④

1) 692 2) 700 3) 680 4) 720

20) If the radius of a circle is increased by 10% , by what percentage will the area increase ?

1) 10% 2) 21% 3) 44% 4) 100% ①②③④

18. Triangle

Important information

❖ **Formulas:**

Area = 12× base × height 21× base × height

Heron's formula: Area =s(s−a)(s−b)(s−c) Area =s(s−a)(s−b)(s−c), where s=a+b+c2s=2a+b+c

Pythagorean Theorem: Diagonal 2= Base 2+ Height 2 Diagonal 2= Base 2+ Height 2

Ratio of areas of similar triangles = square of (ratio of sides)

Sample questions

1) The measures of two angles of a triangle are 45° and 65° . What is the measure of the third angle ? ①②●④

1) 50° 2) 60 ° 3) 70° 4) 80°

Explanation - Sum of angles of a triangle = 180° ∴ Third angle = 180° - (45° + 65°) = 70°

2) Each side of an equilateral triangle is 8 cm. What is its height ? ●②③④

1) 4 √ 3 cm 2) 6 √ 3 cm 3) 8 √ 3 cm 4) 12 √ 3 cm

Explanation - Height of an equilateral triangle = $(\sqrt{3}/2) \times$ side = $(\sqrt{3}/2) \times 8 = 4\sqrt{3}$ cm

3) The sides of a triangle are 6 cm , 8 cm and 10 cm. So what type of triangle is it ? ①②●④

1) Obtuse angle 2) Obtuse angle 3) Right angle 4) Rhombus

Explanation - $6^2 + 8^2 = 36 + 64 = 100 = 10^2$ ∴ Pythagorean theorem is proved ⇒ Right triangle

Exercise

1) If the base of a triangle is 12 cm and the height is 5 cm , what is the area ? ①②③④

1) 30 sq.cm 2) 60 Sq.cm 3) 15 Sq.cm 4) 17.5 Sq.cm

2) The sides of a triangular garden are 30 m , 40 m , and 50 m. What is the area of the garden ?

1) 600 sq.m. 2) 1200 Sq.m 3) 300 sq.m 4) 750 sq.m ①②③④

3) The ratio of the sides of two similar triangles is 3:5 . If the area of the smaller triangle is 27 sq.cm , what is the area of the larger triangle ? ①②③④

1) 75 sq.cm 2) 45 sq.cm 3) 60 Sq.cm 4) 125 Sq.cm .

4) In a right triangle, one leg is 15 cm and the diagonal is 17 cm. What is the length of the other leg ? ①②③④

1) 8 cm 2) 10 cm 3) 6 cm 4) 12 cm

5) What is the area of the triangle formed by the points (0,0), (4,0), and (0,3) ? ①②③④

1) 6 sq.cm 2) 12 sq.cm 3) 5 sq.cm 4) 7.5 Square cm

6) The sides of a triangle with perimeter 36 cm are in the ratio 3:4:5 . What is its area ? ①②③④

1) 54 sq.cm 2) 72 Sq.cm 3) 108 Sq.cm 4) 36 Sq.cm

7) There is a 10 meter tall tree on a straight road . A bird is sitting 24 meters from the root of the tree. What is the distance from the bird to the top of the tree ? ①②③④

1) 26 m 2) 25 m 3) 28 m 4) 30 m

8) 14 What is the area of an equilateral triangle inscribed in a circle of radius cm ? ①②③④

1) 1473 sq.cm 2) 493 sq.cm 3) 983 sq.cm 4) 1963 sq.cm

9) The area of a triangle is 84 sq.cm and the base is 14 cm. What is the height ? ①②③④

1) 12 cm 2) 10 cm 3) 8 cm 4) 6 cm

10) The ratio of the areas of two similar triangles is 16:25 . What is the ratio of their corresponding sides ? ①②③④

1) 4:5 2) 5:4 3) 16:25 4) 25:16

11) What is the area of a triangle with sides 7 cm , 24 cm , 25 cm ? ①②③④

1) 84 sq.cm 2) 168 sq.cm 3) 42 sq.cm 4) 96 sq.cm

12) The area of a triangular field is 180 sq.m. If its base is 20 m , what is its height ? ①②③④

1) 18 m 2) 9 m 3) 36 m 4) 24 m

13) What is the perimeter of a triangle with sides of 8 cm , 15 cm , 17 cm ? ①②③④

1) 40 cm 2) 120 cm 3) 15 cm 4) 8 cm

14) What is the area of the triangle formed by the points (2,3), (−1,0), and (4,1) ? ①②③④

1) 7 sq. units 2) 14 sq. units 3) 10.5 sq. units 4) 21 sq. units

15) The area of a triangle is 48 sq.cm. If the ratio of base to height is 3:2 , then what is the base ?

1) 12 cm 2) 18 cm 3) 24 cm 4) 6 cm ①②③④

16) The perimeter of an isosceles triangle is 36 cm. If the equal side is 10 cm , what is the length of the third side ? ①②③④

1) 16 cm 2) 12 cm 3) 10 cm 4) 14 cm

What is the area of the largest triangle that can be drawn from a square with side length 12 cm ?

1) 72 sq.cm 2) 144 Sq.cm 3) 36 Sq.cm 4) 24 Sq.cm ①②③④

18) The perimeters of two similar triangles are 20 cm and 30 cm. What is the ratio of their areas ?

1) 4:9 2) 2:3 3) 3:2 4) 1:1.5 ①②③④

19) What is the area of an equilateral triangle with a height of 10 cm ? ①②③④

1) 31003 sq.cm 2) 3503 sq.cm 3) 3253 sq.cm 4) 31003 sq.cm

20) The length of the shadow of a tree is 9 meters and the height of the tree is 12 meters. At the same time , the shadow of a pillar is 3 meters. What is the height of the pillar ? ①②③④

1) 4 m 2) 6 I 3) 8 I 4) 10 I

19. Quadrilateral, square, rectangle

Important information

- **Formulas:**
- Perimeter of Rectangle = 2 × (Length + Width)
- Area of Rectangle = Length × Width
- Perimeter of Square = 4 × Sides
- Area of Square = Side ^{2}
- Area of a rectangle = length × width

Sample questions

1) The side of a square is 12 cm. What is its area ? ●①②③④

1) 144 sq.cm 2) 120 sq.cm 3) 100 sq.cm 4) 48 sq.cm

Explanation - Area of a square = side × side = 12 × 12 = 144 sq.cm

2) The length of a rectangle is 15 cm and the breadth is 10 cm. Then its perimeter is How much ?

1) 30 cm 2) 50 cm 3) 100 cm 4) 150 cm

Explanation - Perimeter of rectangle = 2 × (length + width) = 2 × (15 + 10) = 50 cm

3) The perimeter of a square and the perimeter of a rectangle are the same. The side of the square is 12 cm and the length of the rectangle is 14 cm. So what is the area of the rectangle? ?

1) 120 sq.cm 2) 140 sq.cm 3) 100 sq.cm 4) 160 sq.cm

Explanation - Perimeter of a square = 4 × side = 4 × 12 = 48 cm
Perimeter of a rectangle = 2 × (length + width) ⇒ 48 = 2 × (14 + width) ⇒ width = 10 cm
Area of a rectangle = length × width = 14 × 10 = 140 sq.cm

Exercise

1) If the side of a square is 12 cm , what is its diagonal ? ①②③④

1) 12 √ 2 2) 24 3) 6 √ 2 4) 18

2) The length of a rectangular field is 45 meters and the width is 20 meters. What is the length of the diagonal of the field ? ①②③④

1) 50 m 2) 45 √ 5 m 3) 65 m 4) 35 √ 3 m

3) All four sides of a square are 10 cm and one diagonal is 16 cm. What is its area ? ①②③④

1) 96 sq.cm 2) 100 sq.cm 3) 80 sq.cm 4) 120 sq.cm

4) The length of a rectangle is 25 cm and the width is 2 / 5 times the length. What is the perimeter ? ①②③④

1) 70 cm 2) 50 cm 3) 100 cm 4) 35 cm

5) The parallel sides of a trapezoid are 8 cm and 12 cm. If the height is 6 cm , what is the area ?

1) 60 sq.cm. 2) 48 sq.cm 3) 72 sq.cm 4) 96 sq.cm ①②③④

6) The area of a square tile is 324 sq.cm. What is the length of each side ? ①②③④

1) 18 cm 2) 16 cm 3) 24 cm 4) 9 cm

7) The length of a rectangle is increased by 20% and the width is decreased by 10% . What is the percentage change in area ? ①②③④

1) 8% increase 2) 10% reduction 3) 12% decrease 4) 5% increase

8) The diagonals of a rhombus are 24 cm and 10 cm. What is its side ? ①②③④

1) 13 cm 2) 12 cm 3) 15 cm 4) 17 cm

9) The perimeter of a rectangle is 40 cm and the length is 12 cm. What is its area ? ①②③④

1) 96 sq.cm 2) 120 sq.cm. 3) 48 sq.cm 4) 60 sq.cm

10) The ratio of the areas of a square and a rectangle is 1:2 . If the side of the square is 14 cm , and the length of the rectangle is 28 cm, then What is the width ? ①②③④

1) 7 cm 2) 14 cm 3) 21 cm 4) 28 cm

11) What is the area of the rectangle formed by the points (2,3), (6,3), (6,7), (2,7) ? ①②③④

1) 16 sq. units 2) 24 sq. units 3) 12 sq. units 4) 8 sq. units

12) The measures of three angles of a quadrilateral are 80°, 100°, and 120° . What is the measure of the fourth angle ? ①②③④

1) 60° 2) 90° 3) 70° 4) 80°

13) The diagonals of a rectangle are 18 cm long. What is the distance from the point of intersection of the diagonals to one of the vertices ? ①②③④

1) 9 cm 2) 18 cm 3) 6 cm 4) 4.5 cm

14) If the side of a square is increased by 20% , what percentage will be the increase in area ?

1) 44% 2) 20% 3) 40% 4) 48% ①②③④

15) The area of a trapezoid is 105 sq.cm. If the parallel sides are 15 cm and 20 cm , what is the height ? ①②③④

1) 6 cm 2) 7 cm 3) 10.5 cm 4) 12 cm

16) The length of a rectangle is 24 cm and the diagonal is 25 cm. What is the width ? ①②③④

1) 7 cm 2) 10 cm 3) 12 cm 4) 15 cm

17) It costs Rs. 2000 to fence a square garden at the rate of Rs . 50 per meter. What is the area of the garden ? ①②③④

1) 2500 sq.m. 2) 100 sq.m. 3) 625 sq.m. 4) 400 Sq.m

18) The area of a rhombus is 120 sq.cm and one diagonal is 24 cm. What is the length of the other diagonal ? ①②③④

1) 10 cm 2) 12 cm 3) 15 cm 4) 20 cm

19) The side of a rhombus is 13 cm and one diagonal is 24 cm. What is the perimeter ? ①②③④

1) 52 cm 2) 48 cm 3) 60 cm 4) 72 cm

20) The sum of the areas of a square and a rectangle is 250 sq.cm. The side of the square is equal to the length of the rectangle. The width of the rectangle is 5 cm , what is the side of the square ? ①②③④

1) 10 cm 2) 15 cm 3) 20 cm 4) 25 cm

20. Cube

Important information

❖ **Formulas:**

Volume = (side) 3

Surface Area = 6 × (side ^{2})

Sample questions

1) If the total surface area of a cube is 486 cm^2 If so , what is the length of one side of that cube ?

1) 9 cm 2) 6 cm 3) 12 cm 4) 8 cm ①②③④

Explanation – $6 \times a^2 = 486 \Rightarrow a^2 = 81 \Rightarrow a = \sqrt{81} = 9$

2) The total surface area of a cube is 150 cm^2 . So what will be the area of one of its sides ?

1) 30 cm^2 2) 25 cm^2 3) 36 cm^2 4) 20 cm^2 ①②③④

Explanation - Total surface area = $6 \times a^2 \Rightarrow 150 = 6 \times a^2 \Rightarrow a^2 = 25 \Rightarrow$ Area of one side = 25

3) If the total surface area of a cube is 216 cm^2 If so , what is the volume of the cube ? ①②③④

1) 64 cm^3 2) 125 cm^3 3) 216 cm^3 4) 512 cm^3

Explanation - Total surface area = $6a^2 \Rightarrow a^2 = 36 \Rightarrow$ Side = $6 \Rightarrow V = a^3 = 6^3 = 216$ Volume of cube = Side3 = (6)3 = 216 cm^3

Exercise

1) If the side of a cube is 5 cm, what is the volume of the cube ? ①②③④

1) 125 sq.cm 2) 150 sq.cm. 3) 100 sq.cm 4) 25 sq.cm

2) The side of a cubic water tank is 2 meters. How many liters of water will fit in the tank ?

(1 cubic meter = 1000 liters) ①②③④

1) 8000 liters 2) 4000 liters 3) 2000 liters 4) 6000 liters

3) The surface area of a cube is 294 sq.cm. What is the length of its diagonal ? ①②③④

1) 7 √ 3 cm 2) 14 √ 3 cm 3) 21 √ 3 cm 4) 7 cm

4) If the side of a cube is increased by 50% , what percentage will be the increase in the volume of the cube ? ①②③④

1) 150% 2) 237.5% 3) 337.5% 4) 50%

5) What is the lateral surface area of a cube with sides of 10 cm ? ①②③④

1) 400 sq.cm 2) 600 sq.cm. 3) 200 sq.cm. 4) 100 sq.cm

6) The sides of three cubes are 2 cm , 3 cm , and 4 cm. If they are melted to form a larger cube , then the sides of the new cube are How much ? ①②③④

1) 1) 6 cm 2) 5 cm 3) 7 cm 4) 4.5 cm

7) It costs Rs 864 to paint the outside of a cubic box at a rate of Rs 12 per sq. cm . What is the length of the side ? ①②③④

1) 6 cm 2) 4 cm 3) 8 cm 4) 3 cm

8) If the diagonal of a cube is $10\sqrt{3}$ cm , what is its volume ? ①②③④

1) 1000 sq.cm 2) 500 sq.cm. 3) 250 sq.cm 4) 750 sq.cm

9) The volume of a cube is 343 sq.cm. What is the length of one of its diagonals ? ①②③④

1) $7\sqrt{2}$ cm 2) 14 cm 3) 7 cm 4) $10\sqrt{2}$ cm

10) How many small cubes of 3 cm side can be cut from a cube of 15 cm side ? ①②③④

1) 125 2) 25 3) 50 4) 100

11) The surface area of a cube is 54 sq.cm. What is the sum of the lengths of all the diagonals (faces + space) of that cube ? ①②③④

1) $12\sqrt{3} + 12\sqrt{2}$ 2) $6\sqrt{3} + 12\sqrt{2}$ 3) $12\sqrt{3} + 6\sqrt{2}$ 4) $18\sqrt{3} + 12\sqrt{2}$

12) If the lateral surface area of a cube is 256 sq.cm, what is the side ? ①②③④

1) 8 cm 2) 6 cm 3) 10 cm 4) 12 cm

13) The side of a cube of soap is 7 cm. What is the cost of pasting packing paper on it at the rate of Rs . 5 per sq. cm ? ①②③④

1) Rs. 1470 2) Rs. 1050 3) Rs.2100 4) Rs.700

14) The ratio of the sides of two cubes is 2:3 . What is the ratio of their volumes ? ①②③④

1) 4:9 2) 8:27 3) 2:3 4) 6:12

15) If the length of each side of a cube is reduced by 20% , what percentage of reduction will there be in the surface area ? ①②③④

1) 36% 2) 40% 3) 20% 4) 44%

16) What is the volume of a cube with a diagonal of 12 cm ? ①②③④

1) $64\sqrt{3}$ sq. cm 2) 1728 sq.cm 3) 512 sq.cm 4) 144 sq.cm

17) The volume of a cube is 729 sq.cm. What is the area of one of its sides ? ①②③④

1) 81 sq.cm 2) 144 sq.cm 3) 49 sq.cm 4) 121 sq.cm

18) What is the volume of a cube with a lateral surface area of 64 sq.cm ? ①②③④

1) 64 sq.cm 2) 125 sq.cm 3) 216 Sq.cm 4) 512 Sq.cm

19) If all the edges of a cube are increased by 2 cm , the volume increases by 488 sq.cm. What is the original side ? ①②③④

1) 8 cm 2) 10 cm 3) 6 cm 4) 5 cm

20) A cubic tank of side 1.5 m contains 75% water. What is the volume of water ? ①②③④

1) 3.375 cubic meters 2) 2.531 cubic meters

3) 4.5 cubic meters 4) 1.125 cubic meters

21. Documentary

Important information

- **Formulas :**
- Area of a circle = $2\pi rh$
- Total surface area of the newspaper = $2\pi r(h + r)$
- Volume of a circle = $\pi r^2 h$

Sample questions

1) The volume of a newspaper is 3850 cubic cm and the height is 25 cm. What is its radius ?
(Take $\pi = 22/7$) ●②③④

1) 7 cm 2) 10 cm 3) 14 cm 4) 21 cm

Explanation - Volume = $\pi r^2 h$
$\Rightarrow 3850 = (22/7) \times r^2 \times 25$
$\Rightarrow r^2 = (3850 \times 7)/(22 \times 25) = 49$
$\Rightarrow r = 7$ cm

2) The total surface area of a newspaper is 968 sq.cm and the radius is 7 cm. So what is the height ? (Take $\pi = 22/7$) ①②●④

1) 10 cm 2) 12 cm 3) 15 cm 4) 18 cm

Explanation - Total surface area = $2\pi r(r + h)$
$\Rightarrow 968 = 2 \times (22/7) \times 7 \times (7 + h)$
$\Rightarrow 968 = 44 \times (7 + h)$
$\Rightarrow 7 + h = 22 \Rightarrow h = 15$ cm

3) The volume of a cylinder is 3850 cubic cm and its height is 25 cm. What is its radius ?
(Take $\pi = 22/7$) ●②③④

1) 7 cm 2) 10 cm 3) 14 cm 4) 21 cm

Explanation - Volume = $\pi r^2 h$
$\Rightarrow 3850 = (22/7) \times r^2 \times 25$
$\Rightarrow r^2 = (3850 \times 7)/(22 \times 25) = 49$
$\Rightarrow r = 7$ cm

Exercise

1) If the radius of a triangle is 7 cm and the height is 20 cm, what is its volume ? ①②③④

1) 3080 cubic cm 2) 2940 cubic cm 3) 1540 cubic cm 4) 980 π Cubic cm

2) A rectangular tank has a radius of 1.4 m and a height of 5 m. How many litres of water will be stored in the tank ? ①②③④

1) 30,800 liters 2) 15,400 liters 3) 44,000 liters 4) 10,000 liters

3) If the curved surface area of a triangle is 1320 cm2 and the height is 21 cm, what is the radius?

1) 10 cm 2) 7 cm 3) 14 cm 4) 5 cm ①②③④

4) If the radius of a triangle is 14 cm and the total surface area is 2992 sq cm, what is the height ?

1) 20 cm 2) 15 cm 3) 25 cm 4) 10 cm ①②③④

5) The height of an iron cylinder is increased by 50% and the radius is reduced by 20% . What is the percentage change in volume ? ①②③④

1) 4% decrease 2) 20% increase 3) 10% reduction 4) 5% increase

6) The ratio of the volumes of two parallelepipeds is 27 : 64. If the ratio of their heights is 3 : 4 , what is the ratio of their radii ? ①②③④

1) 3:4 2) 9:16 3) 6:8 4) 4:3

7) If the radius of a circular cone is 10 cm and the area of the cone is 880 cm2, what is its height ?

1) 14 cm 2) 7 cm 3) 10 cm 4) 12 cm ①②③④

8) What is the total surface area of a newspaper with a diameter of 1.5 meters and a height of 2 meters ? ①②③④

1) 11.25 π Four 2) 13.75 π Four 3) 7.5 π Four 4) 5 π Four

9) The volume of a circular cylinder is 12320 cubic cm and the radius is 14 cm. What is the ratio of its total surface area to its curved surface area ? ①②③④

1) 3:2 2) 4:3 3) 5:3 4) 7:5

10) The sum of the radius and height of a triangle is 37 cm. If the total surface area is 1628 sq cm , what is the radius ? ①②③④

1) 7 cm 2) 14 cm 3) 21 cm 4) 10 cm

11) What is the volume of a newspaper pile with a diameter of 2 meters and a height of 10 meters ? ①②③④

1) 31.4 cubic meters 2) 62.8 cubic meters

3) 15.7 cubic meters 4) 125.6 cubic meters

12) The outer radius of a circular pipe is 12 cm and the inner radius is 9 cm. If the length of the pipe is 14 cm , then the metal What is the cube ? ①②③④

1) 1386 π Cubic cm 2) 2772 π Cubic cm 3) 4158 π Cubic cm 4) 693 π Cubic cm

13) The volume of a newspaper is 2156 cubic cm and the height is 14 cm. What is the ratio of its curved surface area to its total surface area ? ①②③④

1) 2:3 2) 3:5 3) 5:7 4) 7:9

14) If the curved surface area of a triangle is 440 cm2 and the height is 10 cm, what is the radius?

1) 7 cm 2) 14 cm 3) 21 cm 4) 3.5 cm ①②③④

15) The height of a newspaper stack is 15 cm. If its radius is increased by 20% and its height is decreased by 10% , what is the percentage change in its volume ? ①②③④

1) 29.6% increase. 2) 44.4% decrease

3) 43 6.4% increase 4)2 3.2% decrease

16) If the radius of a circular reservoir is 7 m and the depth is 6 m , how many liters of water can it store ? (1 m^3 = 1000 liters) ①②③④

1) 462000 liters 2) 924000 liters 3) 154000 liters 4) 185000 liters

17) The diameter of a circular disk is 14 cm and the height is 10 cm. What is its curved surface area ? ①②③④

1) 220 square centimeters 2) 440 square centimeters

3) 660 square centimeters 4) 880 square centimeters

18) The area of a circular disk is 616 square cm and its height is 14 cm. What is the radius ?

1) 7 cm 2) 6 cm 3) 8 cm 4) 9 cm ①②③④

19) A water tank has a radius of 5 m and a height of 2 m. The water filled in the tank is sold at the rate of Rs . 25/1000 litres. If so , what is the cost of a full tank of water ? ①②③④

1) ₹785 2) ₹785.4 3) ₹785.5 4) ₹786

20) A solid metal cylinder has a diameter of 10 cm and a height of 21 cm. What is its volume ?

1) 1650 cubic cm 2) 1650 π Cubic cm ①②③④

3) 525 π Cubic cm 4) 1050 π Cubic cm

22. Cone

Important information

- Surface area of cone = π rl
- Total curved surface area of cone = π rl + $\pi r^2 = \pi r (l + r)$
- Volume of cone = $1/3 \pi r^2 h$

Sample questions

1) The radius of the cone is 7 cm and the slant height (l) is 25 cm. Then its curved surface area is How much ? (Take $\pi = 22/7$) ①②③④

1) 550 sq.cm 2) 500 sq.cm 3) 450 sq.cm 4) 400 Square cm

Explanation - Curved surface area = $\pi rl = (22/7) \times 7 \times 25 = 550$ sq.cm

2) The height of a cone is 24 cm and the radius is 7 cm. What is its volume ? (Take $\pi = 22/7$)

1) 1232 cubic cm 2) 1100 cubic cm ●②③④

3) 1000 cubic cm 4) 900 cubic cm

Explanation - Volume = $(1/3)\pi r^2 h = (1/3) \times (22/7) \times 7^2 \times 24 = 1232$ cubic cm

3) The total surface area of a cone is 704 sq.cm and the radius is 7 cm. So what is the slant height ? (Take $\pi = 22/7$) ①●③④

1) 20 cm 2) 25 cm 3) 30 cm 4) 35 cm

Explanation - Total surface area = $\pi r(r + l)$

$704 = (22/7) \times 7 \times (7 + l)$

$704 = 22 \times (7 + l)$ $\quad 7 + l = 32 \Rightarrow l = 25$ cm

Exercise

1) If the radius of the cone is 7 cm and the height is 24 cm , what is the volume ? ($\pi = 22/7$)

1) 1232 cubic cm 2) 2464 cubic cm ①②③④

3) 3696 cubic cm 4) 1848 cubic cm

2) A conical tent has a radius of 7 m and a slant height of 25 m. Draw the curved surface area of the tent. ①②③④

1) 550 square meters 2) 1100 square meters

3) 2200 square meters 4) 3300 square meters

3) The ratio of radii of two cones is 2:3 and the ratio of heights is 5:7 . What is the ratio of their volumes ? ①②③④

1) 20:63 2) 10:21 3) 5:7 4) 4:9

4) If the slant height of a cone is 25 cm and the radius is 7 cm , what is its height ? ①②③④

1) 24 cm 2) 20 cm 3) 18 cm 4) 15 cm

5) If the height of a cone is reduced by 30% and the radius is increased by 40% , what is the percentage change in volume ? ①②③④

1) 37.2% increase 2) 20% reduction 3) 10% increase 4) 5% decrease

6) The volume of a cone of height 14 cm is 1232 cubic cm. What is the radius ? (π = 22/7)

1) 7 cm 2) 14 cm 3) 21 cm 4) 28 cm ①②③④

7) If the total surface area of a cone is 704 sq cm and the radius is 7 cm, what is the slant height?

1) 25 cm 2) 20 cm 3) 15 cm 4) 10 cm ①②③④

8) The surface area of a cone is 2200 sq cm and the slant height is 50 cm. Find the radius.

1) 14 cm 2) 7 cm 3) 21 cm 4) 28 cm ①②③④

9) A cone-shaped candy has a diameter of 14 cm and a height of 15 cm. How many cubic centimeters of chocolate will be contained in the candy ? ①②③④

1) 770 cubic cm 2) 1540 cubic cm 3) 2310 cubic cm 4) 3080 cubic cm

10) The volume of a cone is 4928 cubic cm and the slant height is 25 cm. Find the radius and height. ①②③④

1) r = 14 cm , h = 24 cm 2) r = 7 cm , h = 24 cm

3) r = 21 cm , h = 20 cm 4) r = 28 cm , h = 15 cm

11) If the radius of a cone is 5 cm and the slant height is 13 cm , what is the height ? ①②③④

1) 12 cm 2) 10 cm 3) 8 cm 4) 6 cm

12) The total surface area of a cone is 1386 sq cm and the slant height is 21 cm. Find the radius.

1) 14 cm 2) 7 cm 3) 21 cm 4) 3.5 cm ①②③④

13) The circumference of the base of a cone is 44 cm and the height is 24 cm . What is the volume ? ①②③④

1) 1232 cubic cm 2) 616 cubic cm 3) 2464 cubic cm 4) 3696 cubic cm

14) The sum of the radius and height of a cone is 35 cm and the slant height is 25 cm. Find the radius. ①②③④

1) 7 cm 2) 15 cm 3) 20 cm 4) 10 cm

15) If the curved surface area of a cone is 330 cm2 and the radius is 7 cm , what is the oblique height ? ①②③④

1) 15 cm 2) 10 cm 3) 7.5 cm 4) 5 cm

16) The volume of a cone is in the ratio 3:5 . If their radii are equal , what is the ratio of their heights ? ①②③④

1) 3:5 2) 9:25 3) 5:3 4) 25:9

17) The radius of a cone is 12 cm and the height is 16 cm. What is the ratio of its curved surface area to its total surface area ? ①②③④

1)3:5 2) 4:7 3) 5:8 4) 6:11

18) The ratio of radius to height of a cone is 2:3 and the volume is 1232 cubic cm. Find the radius. ($\pi = 22/7$) ①②③④

1) 7 cm 2) 14 cm 3) 10.5 cm 4) 21 cm

19) The volume of a cone is 4400 cubic cm and the diameter of the base is 14 cm. Find the height. ①②③④

1) 90 cm 2) 86.7 cm 3) 80 cm 4) 60 cm

20) If the base circumference of a cone is 88 cm and the slant height is 20 cm, what will be the curved surface area ? ①②③④

1) 880 square centimeters 2) 1760 square centimeters

3) 440 square centimeters 4) 1320 square centimeters

23.Circle

Important information

❖ **Formulas -**

Volume of a sphere – $4/3\ \pi\ r3$

Curvature of a sphere = $4 \times \pi\ r^2$

Sample questions

1) The radius of a sphere is 7 cm. What is its surface area ? (Take $\pi = 22/7$) ●②③④

1) 616 sq.cm 2) 500 sq.cm 3) 450 sq.cm 4) 400 sq.cm

Explanation - Surface area = $4\pi r^2 = 4 \times (22/7) \times 7 \times 7 = 616$ sq.cm

2) The volume of a sphere is 4851 cubic cm. So what is its radius ? (Take $\pi = 22/7$) ●②③④

1) 10.5 cm 2) 12 cm 3) 14 cm 4) 15.5 cm

Explanation - Volume = $(4/3)\pi r^3$

$4851 = (4/3) \times (22/7) \times r^3$

$r^3 = (4851 \times 3 \times 7)/(4 \times 22) = 1157.625$

$r = \sqrt[3]{1157.625} \approx 10.5$ cm

3) The ratio of the radii of two spheres is 2:3 . What is the ratio of their surface areas ? ●②③④

1) 4:9 2) 2:3 3) 8:27 4) 1:3

Explanation - Area ratio = (Ratio of radii)^2 = $(2/3)^2$ = 4/9

Exercise

1) The diameter of a sphere is 14 cm. What is its surface area ? (π = 22/7) ①②③④

1) 616 sq.cm 2) 308 sq.cm 3) 452 sq.cm 4) 704 sq.cm

2) What is the formula for cube root ? ①②③④

1) $4\pi r^2$ 2) $(4/3)\pi r^3$ 3) $2\pi rh$ 4) $\pi r^2 h$

3) The radius of a sphere is 3 cm. What is the volume ? (π = 3.14) ①②③④

1) 113.04 cm 2) 141.3 cm 3) 119.2 cm 4) 122.5 cm

4) If the surface area of a sphere is 201.06 sq.cm , what is its radius ? (π = 3.14) ①②③④

1) 4 cm 2) 5 cm 3) 6.5 cm 4) 7 cm

5) If the volume is to be doubled , how many times will the radius have to be increased ?

1) $\sqrt{2}$ times 2) 2 times 3) 3 times 4) 1.5 times ①②③④

6) The volume of a sphere is 268.08 cubic centimeters. What is its radius ? (π = 3.14) ①②③④

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

7) What will be the diameter of a sphere with a volume of 343 cubic centimeters ? ①②③④

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

8) If the radius is doubled , how many times will the volume increase ? ①②③④

1) 2 times 2) 4 times 3) 6 times 4) 8 times

9) The radius of a sphere is 10 cm. What is its surface area ? (π = 3.14) ①②③④

1) 1256 sq.cm 2) 1314 sq.cm 3) 1380 sq.cm 4) 1413 sq.cm

10) If the diameter of a sphere is 6 cm, what is its volume ? (π = 3.14) ①②③④

1) 113.04 2) 80.12 3) 95.45 4) 99.99

11) The surface area of a sphere is 154 sq.cm. What is the radius ? (π = 22/7) ①②③④

1) 3.5 cm 2) 4 cm 3) 5 cm 4) 7 cm

12) A sphere of radius 2 cm was formed by melting the material in a sphere . If the radius of the original sphere is 4 cm , then how many smaller spheres are there? Will it become ? ①②③④

1) 4 2) 6 3) 8 4) 2

13) What is the value of the radius of a sphere with a volume of 125 cm3 ? (π = 3.14) ①②③④

1) 3.6 cm 2) 3.9 cm 3) 3.5 cm 4) 3.0 cm

14) The surface area of a sphere is 5544 square centimeters. What is its radius ? (π = 3.14)

1) 21 cm 2) 18 cm 3) 22 cm 4) 24 cm ①②③④

15) If the diameter of a sphere is doubled, how many times will its surface area increase ?

1) 2 times 2) 3 times 3) 4 times 4) 8 times ①②③④

16) The volume of a sphere is 36 π. It is cubic cm. What will be its diameter ? ①②③④

1) 2 cm 2) 3 cm 3) 4 cm 4) 6 cm

17) The radius of a large sphere is 14 cm. If the radius of the smaller spheres made of the same metal is 7 cm , then How many small balls will be formed ? ①②③④

1) 8 2) 4 3) 2 4) 6

18) The side of a cube immersed in a sphere is 7 cm. Then approximately how much volume of that cube will be occupied by the sphere ? ①②③④

1) 343 cubic cm 2) 515 cubic cm 3) 718 cubic cm 4) 999 cubic cm

19) The diameter of a round bar of soap is 14 cm. If the weight of 1 sq. cm of soap is 10 grams , what is the total weight of the soap ? ①②③④

1) 6.16 kg 2) 12.32 kg 3) 3.08 kg 4) 1.54 kg

20) The volume of a sphere is 179.67 cubic meters. What is its radius ? (π =3.14) ①②③④

1) 3.5 m 2) 4.5 m 3) 5.5 m 4) 6.5 m

24. Hemisphere

Important information

- Curved surface area = 2 π r ^{2}
- Total surface area of the hemisphere = 2 π r2 (curved surface) + π r2

Sample questions

1) Of a hemisphere The area of the curved surface is 693 sq.cm. What is its radius (r) ? (Take π = 22/7) ①②③④

1) 10.0 cm 2) 10.5 cm 3) 11.0 cm 4) 11.5 cm

Explanation - Only the area of a hemisphere is given by Area = $2\pi r^2$
: Area = 693 sq.cm
$2 \times (22/7) \times r^2 = 693$
10.5 cm

2) The radius of a hemisphere is 7 cm. What will be its total surface area ? (Take $\pi = 22/7$)

1) 308 sq.cm 2) 462 sq.cm 3) 616 sq.cm 4) 154 sq.cm ①②③④

Explanation - Total surface area of hemisphere = Area of curved surface + Area of circular base
= $2\pi r2$ (curved surface) + $\pi r2$
= $3\pi r2$
Here, radius $r=7r=7$ cm
= 462 sq.cm
10.5 cm

Exercise

1) If the radius of the hemisphere is 7 cm , what is the area of the sphere ? (π =22/7) ①②③④

1) 308 sq.cm 2) 616 sq.cm 3) 462 sq.cm 4) 154 sq.cm

2) The diameter of a hemispherical bowl is 14 cm. What is its volume ? (π =22/7) ①②③④

1) 1437.33 cubic cm 2) 718.66 cubic cm

3) 2156 cubic cm 4) 359.33 cubic cm

3) If the total surface area of the hemisphere is 462 sq.cm , what is the radius ? (π =22/7)

1) 7 cm 2) 14 cm 3) 21 cm 4) 3.5 cm ①②③④

4) If the radius of the hemisphere is increased by 20% , what percentage will be the increase in volume ? ①②③④

1) 72.8% 2) 44% 3) 20% 4) 60%

5) How much will it cost to paint a semi-circular roof of radius 3.5 meters at the rate of Rs. 50 per square meter ? (π =22/7) ①②③④

1) Rs.3850 2) Rs.1925 3) Rs.7700 4) Rs.5775

6) The ratio of the radii of two hemispheres is 3:5 . What is the ratio of their volumes ? ①②③④

1) 27:125 2) 9:25 3) 3:5 4) 6:10

7) If the volume of a hemisphere is 19404 cubic cm , what is the radius ? (π =22/7) ①②③④

1) 21 cm 2) 14 cm 3) 7 cm 4) 3.5 cm

8) The radius of a hemispherical tank is 2.1 meters. How many liters of water will be stored in the tank ? (1 cubic meter = 1000 liters) ①②③④

1) 19404 liters 2) 9702 liters 3) 4851 liters 4) 2425.5 liters

9) If a hemisphere of radius 14 cm is melted and a smaller hemisphere of radius 2 cm is formed , how many smaller hemispheres will be obtained ? ①②③④

1) 343 2) 243 3) 125 4) 512

10) If the circumference of a hemisphere is 44 cm , what is its volume ? (π =22/7) ①②③④

1) 718.66 cm 2) 1437.33 cm 3) 2156 cm 4) 359.33 cm

11) If the curved surface area of a hemisphere is 616 sq.cm , what is the total surface area ?

1) 924 sq.cm 2) 308 sq.cm 3) 154 sq.cm 4) 462 sq.cm ①②③④

12) The total surface area of a hemispherical dome is 1155 sq.m. The cost of painting the dome at the rate of Rs . 10 per sq.m. is How much ? ①②③④

1) Rs.11550 2) Rs.5775 3) Rs.23100 4) Rs.34650

13) Volume of a hemisphere is 48 π If it is cubic cm , what is the ratio of its curved surface area to its total surface area ? ①②③④

1) 2:3 2) 3:5 3) 4:5 4) 1:1

14) If the total surface area of a hemisphere is 942 sq.cm , what is the radius ? (π =3.14)

1) 10 cm 2) 7 cm 3) 14 cm 4) 21 cm ①②③④

15) If the radius of a hemisphere is reduced by 50% , what percentage of the area will be reduced ? ①②③④

1) 75% 2) 50% 3) 25% 4) 60%

16) The diameter of a hemispherical garden is 42 meters. If the cost of fencing around the garden is Rs . 100 per meter , What is the total cost ? ①②③④

1) Rs 13200 2) Rs 6600 3) Rs 3300 4) Rs 1650

17) The volume of a hemisphere is 48510 cubic cm. What is the circumference of its base ? (π =22/7) ①②③④

1) 132 cm 2) 66 cm 3) 44 cm 4) 88 cm

18) If the surface area of a hemisphere is 1386 sq.cm , what is its volume ? (π =22/7) ①②③④

1) 3234 cubic cm 2) 1617 cubic cm 3) 4851 cubic cm 4) 2425.5 cubic cm

19) If the volume of a hemisphere is 179.67 cubic cm , what is the radius ? (π =3.14 π =3.14)

1) 3.5 cm 2) 7 cm 3) 14 cm 4) 21 cm ①②③④

20) 10.5 If a hemisphere of radius cm is melted and a smaller hemisphere of radius 3.5 cm is formed , how many smaller hemispheres will be obtained ? ①②③④

1) 27 2) 9 3) 81 4) 243