

# Government of Tamil Nadu Department of Employment and Training

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OF

# APTITUDE GROUP 4

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# Simplification

#### **Definition:**

 $\geq$ Simplify means to make it simple. In mathematics, simply or simplification is reducing the expression/fraction/problem in a simpler form. It makes the problem easy with calculations and solving.

 $\triangleright$ The operations required to simplify things are done in a set order called BODMAS. Where,

B = Bracket

O = of

D = Division

M = Multiplication

A = Addition

S = Subtraction

#### Algebra – Definition:

 $\triangleright$ Algebra is a branch of mathematics in which arithmetic operations and other formal manipulations are applied to abstract symbols rather than specific numbers.

b) 24, 36

d) 20, 40

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1. The sum of two number is 60 and one number exceeds another by 12. Find the number

a) 21, 39

c) 22, 38

Answer: b) 24, 36

Solution:

Let the number be 'x'

LID LO CILL The greater number x + 12

Sum of two number = 60

x + (x + 12) = 60

2x + 12 = 60

2x = 60 - 12

2 x =48

x=48

2

Smaller number x=24

Greater number x + 12 = 24 + 12 = 36

2. The swum of two number is 116 and one number exceeds another by 32. Find the number

a) 42,74 b) 51, 65 c) 71,45 d) 38, 88 Answer:a) 42,74 Solution: Let the number be 'x' The greater be x + 32Sum of two number =116 x + (x + 32) = 1162x + 32 = 1162x = 116 - 322 x =84 =84 Х 2 Smaller number x=42Greater numbers +32 = 44 + 32 = 743. The sum of two number is 80 and one number less than another by 14. Find the number a) 38, 42 b) 30, 50 c) 28,52 d) 33, 47 Answer:d) 33, 47 Solution: Let the greater number be 'x' ରୋଡ଼ିଆ The smaller number be x - 14ത്ഥവേ Sum of two number = 80x + (x - 14) = 802 x - 14 = 802x = 80 + 142 x =94 x=94 2 Greater number x=47 Smaller numbers -14 = 47 - 14 = 33

4. The sum of two number is 207 and one number is less than another by 53. Find the number.

a) 119,66 b) 140, 87 c) 130,73 d) 148, 95 Answer:c) 130,73 Solution: Let the greater number be 'x'. The smaller number be x - 53Sum of two numbers = 207x + (x - 53) = 2072 x - 53 = 2072x = 207 + 532 x = 260x=260 2 greater x=130 smaller number x -53 = 130 - 53 = 735. one number is twelve times another. If their difference is 143, find the numbers. b) 12, 155 a) 15, 158 c) 12, 157 d) 13, 156 answer:d) 13, 156 Solution: ରୋର୍ଡାଷ୍ମ୍ର LID LO CILL let the number be x second number be 12x. Difference, 1 2 x - x = 143 11 x = 143 143 Х = 11 First number x=13Second number  $12x = 12 \times 13 = 156$ 6. one number is half of the another. If their difference is 51, find the number

a) 102, 51b) 106, 53c) 98, 47d) 88, 37

Answer:a) 102, 51

Solution:

let the first number be  $\ x$ 

Second number be x/2.

Difference,

x - <u>x</u> = 51 2  $\underline{2x - x} = 51$ 2 51 X =2 51 x 2 Х =first number x 102 = second number  $\underline{x} =$ 102 2 2 51

7. A bus is carrying 67 passengers with some people having ₹6 tickets and the remaining having ₹12 tickets. If the total money received from these passengers with ₹6 tickets.

b) 31

d) 37

a) 30

c) 35

Answer:d) 37

х

Solution:

let the number of passengers having  $\gtrless$  6 tickets be 'x' then the number of passengers with  $\gtrless$ 12 tickets is '67-x' total money received from the passengers =  $\gtrless$  582

•

i.e.,

$$x \ \overline{56} + (67 - x) \ x \ \overline{512} = 582$$
  

$$6 \ x + 804 - 12x = 582$$
  

$$804 - 6 \ x = 582$$
  

$$804 - 582 = 6 \ x$$
  

$$222 = 6 \ x$$
  

$$222 = x$$
  

$$6 \ x = 582$$

Number of passengers having  $\gtrless 6$  tickets x = 37 passengers

8. A bus is carrying 40 passengers with some people having ₹7 tickets and the remaining having ₹11 tickets. If the total money received from these passengers is ₹6332, find the number of passengers with ₹11 tickets.

a)	13	b) 14
c)	17	d) 19

answer:a) 13

Solution:

let the number of passengers having ₹ 7

then, the number of passengers having  $\gtrless 11$  ticket be '40 – x'

total money received from the passengers = ₹ 332

i.e.,



9. A total of 50 currency notes, consisting only of ₹ 2 and ₹ 10 denominations amount to₹
140. Find the number of ₹2 currency notes in denomination.

a) 42	b) 40
-------	-------

c) 45 d) 43

Answer: c) 45

Solution:

Let the number of  $\gtrless$  2 notes be 'x '

Then, the no. Of  $\gtrless$  10 notes be ' 50 – x'

Total number  $= \gtrless 140$ 

i.e.,

 $x x \notin 2 + (50 - x) x \notin 10 = 140$ 2 x + 500 - 10x = 140

500 – 8 x	=	140	
500 - 140	=	8 x	
360	=	8 x	
<u>360</u>	=	Х	
8No	. Of ₹	2 notes $x =$	45

10. A total of 110 currency notes, consisting only of ₹ 20 and ₹ 50 denominations, amount to ₹ 4300. Find the number of ₹ 50 currency notes in denominations.

a) 35 b) 40 c) 70 d) 60 Answer: c) 70 Solution: Let the number of  $\gtrless$  20 notes be 'x ' Then, the number of ₹ 50 notes be '110 - x' i.e.,  $x x \neq 20 + (110 - x) x \neq 50 =$ 4300 20 x + 5000 - 50x4300 5500 - 30 x 4300 = 5500 - 430030 x 30 x 1200 = 1200 = Х 30 No. Of  $\gtrless$  20 notes x = 40ରୋଡ଼ାଷ୍ଟ୍ରୀ = 110 - xNo. Of ₹ 50 notes =110 - 40 யே =70 notes.

11.Find two consecutive natural number whose sum is 83.

a) 41,42	b) 37, 38
c) 37,46	d) 42, 43

Answer: a) 41, 42

Solution:

The numbers are natural and consecutive.

Let the number be 'x ' and 'x + 1'.

x x (x + 1) = 832 x + 1 = 83

2 x	=	83 - 1
2 x	=	82
х	=	<u>82</u>
		2
х	=	41
x + 1	=	41 + 1
	=	42

Therefore, the required number are 41 and 42.

12. Find two consecutive natural numbers whose sum is 225.



Therefore, the required numbers are 112 and 113.

# Percentage

#### **Definition:-**

• The term per cent means per hundred or for every hundred. The term per cent is abbreviated as p.c. The symbol % is often used for the term per cent.

• A fraction whose denominator is 100 is called a percentage and the numerator of the fraction is called rate per cent.

• e.g.,  $\frac{1}{100}$  and 1% percent means the same. i.e., 1 part out of every hundred parts.

To express X% as a fraction, divide the X by hundred. i.e.,  $\frac{X}{100}$ 

To express a/b as a percentage  $\left[\frac{a}{b} \times 100\right]$ 

#### **Results in Consumption:-**

• It a price of a commodity increase by R% then the reduction in consumption so as not to increase the expenditure is  $\left[\frac{R}{100+R} \times 100\right]$ 

• If the price of the commodity decrease by R%, then the increase in consumption so as not to decrease the expenditure is  $\left[\frac{R}{100-R} \times 100\right]$ 

#### **Results in Population:-**

Population of a Town/Village (P) is increases at the rate of R% per annum, then

• Population after n years = 
$$P\left[1 + \frac{R}{100}\right]^n$$

• Population n years ago = 
$$\frac{P}{\left[1 + \frac{R}{100}\right]}n$$

#### **Results on Depreciation:-**

• Value of a machine after n years : 
$$P\left[1 - \frac{R}{100}\right]$$

• Value of a machine n years ago:  $P / \left[1 - \frac{R}{100}\right]^n$ 

#### **Results on comparison:-**

• If A is R% more than B, then B is less than A by 
$$\left[\frac{R}{100+R} \times 100\right]\%$$

• If A is R% less than B, then B is more than A by  $\left[\frac{R}{100-R} \times 100\right]\%$ 

If 80% of A = 50 % of B and B= X % of A, then the value of X is ......
 a) 400
 b) 300
 c) 160
 d) 150
 Answer : C) 160
 Solution :
 80 % of A = 50 % of B

$\frac{80}{100}$ x A	$= \frac{50}{100} \times B$
Here B	= X %  of  A
$\frac{\frac{8\theta}{100}}{\frac{100}{5\theta}} \times \frac{\frac{2}{100}}{\frac{5\theta}{5\theta}} \times A$	= <i>B</i>
$\frac{8}{5}A$	= B
1.6 A	= B
160 100 x A	= B
В	=160 % of A

Therefore, Required value x = 160 %



Now, 
$$\frac{x}{100} \times A = B$$
  
 $\frac{7}{4} A = \frac{x \times A}{100}$   
 $\frac{7}{4} \times \frac{100}{25} = x$ 

Therefore, Required values = 175

4) If 80% of A = 60 % of B and B= X % of A, then the value of X is .....  
a) 156 
$$\frac{1}{3}$$
 b) 143  $\frac{1}{3}$  c) 133  $\frac{1}{3}$  d) 174  $\frac{1}{3}$   
Answer : C) 133  $\frac{1}{3}$ 

Solution :

80 % of A = 60 % of B  

$$\frac{80}{100} \times A = \frac{60}{100} \times B$$
Here B = X % of A  

$$\frac{4}{100} \times \frac{400}{43} \times A = B$$
Now,  $\frac{4}{3}A = \frac{x}{100} \times A$   

$$\frac{4}{3} \times 100 = x$$

$$\frac{400}{43} = \frac{x}{133} \frac{1}{3} = x$$
Therefore, Required value,  $x = 133 \frac{1}{3}$ 
5) If 30% of A = 20 % of B and B = X % of A, then the value of X is ......  
a) 190 b) 120 c) 260 d) 150
Answer : C) 150
Solution :  

$$30 \% \text{ of } A = 20 \% \text{ of B}$$

$$\frac{30}{100} \times A = \frac{20}{100} \times B$$
Here B = X % of A  

$$\frac{30}{100} \times A = B$$

$$\frac{3}{2}A = B$$

$$\frac{3}{2}A = B$$
Now,  $\frac{3}{100} \times A = B$ 

$$\frac{3}{2} A = \frac{x X A}{100}$$
$$\frac{3}{2} x 100 50 = X$$

#### Therefore, Required value, X = 150

6) If 60% of A = 30 % of B and B= 40 % of C, C = x % of then the value of X is.....

a) 200 b) 500 c) 800 d) 700 Answer : C) 500 Solution :  $\begin{array}{rcl} 60 \ \% \ \text{of } A &=& 30 \ \% \ \text{of } B \\ \frac{60}{100} \ x \ A &=& \frac{30}{100} \ x \ B \end{array}$ 



7) If 30% of A = 10 % of B and B= 30 % of C, C = X % of A then the value of X is .....

a) 155 b) 375 c) 215 d) 380

Answer : C) 375

Solution :

90 % of A = 40 % of B  

$$\frac{30}{100}$$
 x A =  $\frac{40}{100}$  x B  
 $\frac{90}{100}$  x  $\frac{400}{40}$  x A = B  
 $\frac{9}{4}$  A = B.....(1)  
B = 60 % of C

Therefore, Required value, X = 1000

8) If 90% of A = 40 % of B and B= 60 % of C, C = X % of A then the value of X is



Therefore, Required valueX = 375

9) If 50% of A = 30 % of B and B= 70 % of C, C = X % of A then the value of X is ..... a)  $235\frac{3}{4}$  b)  $216\frac{4}{21}$  c)  $211\frac{10}{417}$  d)  $238\frac{2}{441}$ Answer : C)  $238\frac{2}{441}$  Solution :

50 % of A = 30 % of B  $\frac{50}{100} \times A = \frac{30}{100} \times B$   $\frac{50}{400} \times \frac{400}{40} \times A = B$   $\frac{5}{3}A = B$ ......(1) B=70 % of C  $\frac{5}{3}A = \frac{70}{400} \times C$   $\frac{5}{3} \times \frac{100}{70} \times A = C$   $\frac{50}{21}A = C$  ......(2) C = x % of A  $\frac{50}{21} \times 100 = X$   $\frac{50}{21} = x$   $X = 238 \frac{2}{21}$ Therefore, Required valueX = 238 2/21.

10) If 70% of A = 30 % of B and B= 50 % of C, C = X % of A then the value of X is d)  $472\frac{2}{3}$ ..... c)  $466\frac{2}{3}$ b) 464  $\frac{2}{3}$ a) 454  $\frac{2}{3}$ Answer : C) 466  $\frac{2}{3}$ LID CIL Solution : 70 % of A = 30 % of B $\frac{70}{100}$  x A =  $\frac{30}{100}$  x B  $\frac{70}{100} \times \frac{100}{30} \times A =$ В  $\frac{7}{3}$ A =B.....(1) B=50 % of C  $\frac{7}{3}A = \frac{50}{100}x$  C  $\frac{7}{3} \times \frac{100}{50} \times A = C$  $\frac{14}{3}$ A= C .....(2) С = x % of A

$$\frac{14}{3} \mathbf{A}_{-} = \frac{x}{100} \mathbf{X} \mathbf{A}$$
$$\frac{14}{3} \mathbf{X} 100 = \mathbf{X}$$
$$\frac{1400}{3} = \mathbf{X}$$
$$\mathbf{X} = 466 \frac{2}{3}$$

Therefore, Required valueX = 4662/3.

#### LCM And HCF: Formulas and Tricks With Examples

Factors and Multiples: If a number x divides another number y exactly, we say that x is a

factor of y. Also y is called a multiple of x.

Highest Common Factor (HCF)

The H.C.F. of two or more than two numbers is the greatest number that divides each one of them exactly. There are two methods for determining H.C.F.:

#### 1. Prime factorization method

We can determine the H.C.F. of 144, 180 and 108 from the following process.

- $144 = \underline{2 \times 2} \times 2 \times 2 \times \underline{3 \times 3}$
- $108 = \underline{2 \times 2} \times \underline{3 \times 3} \times 3$
- $180 = \underline{2 \times 2} \times \underline{3 \times 3} \times 5$

In prime factorization of the above mentioned three numbers, the common factorization is  $2 \times 2 \times 3 \times 3 = 36$ .

Thus, the required H.C.F. of 144, 180 and 108 is 36.

#### 2. Division Method

We can determine the H.C.F. of above mentioned numbers from the following process :

$$144 ) \frac{180}{144} (1)$$
  
 $36 ) 144 (1)$ 

Thus, the H.C.F of 144 and 180 is 36.

Now, we find the H.C.F of 36 and 108.

$$36 \Big) \frac{108}{108} \Big( 3$$

So, the required H.C.F is 36.

Lowest Common Multiple (LCM)

The L.C.M. of two or more than two numbers is the least number which is exactly divisible by each one of the given numbers.

Formula

Product of two numbers = (their H.C.F.)  $\times$  (their L.C.M.).

We can determine L.C.M. of two given numbers by the following two methods:

#### **1. Prime Factorization method**

Suppose we have to find the L.C.M. of 12, 16 and 30, then

- $12 = 2 \times 2 \times 3$
- $16 = 2 \times 2 \times 2 \times 2$
- $30 = 2 \times 3 \times 5$

Thus, required L.C.M. of the given numbers

 $= 2 \times 2 \times 2 \times 2 \times 3 \times 5 = 240$ 

#### 2. Division method

We can determine the L.C.M. of above mentioned number from the following process :

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Thus, required L.C.M. of the given number =  $2 \times 2 \times 3 \times 1 \times 4 \times 5 = 240$ 

# H.C.F. and L.C.M. of Fractions

H.C.F. of factions =  $\frac{\text{H.C.F. of Numerators}}{\text{L.C.M. of Denominators}}$ 

For Example, we have to find the H.C.F. of  $\frac{1}{2}$  and

Then, H.C.F. of 
$$\frac{1}{2}$$
 and  $\frac{3}{4} = \frac{\text{H.C.F.of 1 and 3}}{\text{L.C.M.of 2 and 4}} = \frac{1}{4}$ 

L.C.M of fractions = L.C.M.of Numerators H.C.F.Denominators

For Example, we have to find the L.C.M. of 
$$\frac{1}{2}$$
 and  $\frac{3}{4}$ 

Then, L.C.M. of  $\frac{1}{2}$  and  $\frac{3}{4} = \frac{\text{L.C.M. of 1 and 3}}{\text{H.C.F. of 2 and 4}} = \frac{3}{2}$ 

#### **Solved Examples**

1. Find the greatest number which will divide 410, 751 and 1030 leaving a remainder 7 in each case.

Solution: Required number

= H.C.F. of (410 - 7), (751 - 7) and (1030 - 7) = 31.

1qw

2. What least number must be subtracted from 1936 so that the remainder when divided by 9,

10, 15 will leave in each case the same remainder 7?

Solution: The L.C.M. of 9, 10 and 15 is 90.

On dividing 1936 by 90, the remainder = 46.

But 7 is also a part of this remainder.

? Required number = 46 - 7 = 39.

3. Find the HCF and LCM of 1.75, 5.6 and 7

Solution: Making the same number of decimal places, the numbers may be written as 1.75,

5.60 and 7.00.

Without decimal points, these numbers are 175, 560 and 700.

Now, the HCF of 175, 560 and 700 is 35.

? HCF of 1.75, 5.6 and 7 is 0.35.

LCM of 175, 560 and 700 is 2800.

? LCM of 1.75, 5.6 and 7 is 28.00 i.e. 28.

4. Find the greatest number of six digits which on being divided by 6,7, 8, 9 and 10 leaves 4,

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5, 6, 7 and 8 as remainders respectively.

Solution: The L.C.M. of 6, 7, 8, 9 and 10 = 2520

The greatest number of 6 digits = 999999

Dividing 999999 by 2520, we get 2079 as remainder.

Hence the 6 digit number divisible by 2520 is

999999 - 2079 = 997920

Since 6 - 4 = 2, 7 - 5 = 2,

$$8-6=2, 9-7=2,$$

$$10 - 8 = 2$$
,

The remainder in each case is less than the divisor by 2.

? Required number = 997920 - 2 = 997918.

5. Arrange the fractions  $\frac{3}{8}, \frac{7}{12}, \frac{2}{3}, \frac{14}{19}, \frac{16}{25}$  and  $\frac{1}{2}$  in ascending order of magnitude.

Solution: Converting each of the given fractions into decimal form, we get:

 $\frac{3}{8} = 0.75, \frac{7}{12} = 0.583, \frac{2}{3} = 0.666, \frac{14}{19} = 0.736, \frac{16}{25} = 0.64 \text{ and } \frac{1}{2} = 0.5$ Clearly, 0.375 < 0.5 < 0.583 < 0.64 < 0.666 < 0.736?  $\frac{3}{8} < \frac{1}{2} < \frac{7}{12} < \frac{16}{25} < \frac{2}{3} < \frac{14}{19}$ 

6. Find the HCF and LCM of  $14xy^3$ ,  $22x^2y$  and  $26x^3y$ ?. Solution:  $14xy^3 = 2 \times 7 \times x \times y^3$  $22x^2y = 2 \times 11 \times x^2 \times y$  $26x^3y? = 2 \times 13 \times x^3 \times y?$ HCF =  $2 \times x \times y = 2xy$ LCM =  $2 \times 7 \times 11 \times 13 \times x^3 \times y? = 2002x^3y?$ .

7. The HCF of two polynomials is  $x^2 - 1$  and their LCM is  $x? - 10x^2 + 9$ . If one of the polynomials is  $x^3 - 3x^2 - x + 3$ , find the other. Solution: Given that HCF of p (x) and q (x) =  $x^2 - 1 = (x + 1) (x - 1)$ Also, LCM of p (x) and q (x) =  $x? - 10x^2 + 9 = x? - 9x^2 - x^2 + 9$ =  $x^2 (x^2 - 9) - (x^2 - 9) = (x^2 - 9) (x^2 - 1)$ = (x + 3) (x - 3) (x + 1) (x - 1) and p (x) =  $x^3 - 3x^2 - x + 3 = x^2 (x - 3) - (x - 3)$ =  $(x - 3) (x^2 - 1) = (x - 3) (x + 1) (x - 1)$ p(x) .q(x) = (HCF) .(LCM)  $\frac{q(x) = \frac{(HCF) (LCM)}{p(x)} = \frac{(x + 1)(x - 1)(x + 3)(x - 3)(x + 1)(x - 1)}{(x - 3)(x + 1)(x - 1)}$ =  $(x + 3) (x + 1) (x - 1) = (x + 3) (x^2 - 1) = x^3 + 3x^2 - x - 3$ 

8. Find the HCF and LCM of 6, 72 and 120, using the prime factorisation method.

Solution: We have :  $6 = 2 \times 3$ ,

$$72=2^3\times 3^2,$$

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

Here, 2<sup>1</sup> and 3<sup>1</sup> are the smallest powers of the common factors 2 and 3 respectively.

So, HCF (6, 72, 120) =  $2^1 \times 3^1 = 2 \times 3 = 6$ 

2<sup>3</sup>, 3<sup>2</sup> and 5<sup>1</sup> are the greatest powers of the prime factors 2, 3 and 5 respectively involved in the three numbers.

So, LCM (6, 72, 120) =  $2^3 \times 3^2 \times 5^1 = 360$ .

9. Find the GCD of : 
$$14x^3 + 14$$
,  $42(x^2 + 4x + 3)(x^2 - x + 1)$   
Solution:  $p(x) = 14x^3 + 14 = 14(x^3 + 1)$   
 $= 2 \times 7(x + 1)(x^2 - x + 1)$   
 $q(x) = 42(x^2 + 4x + 3)(x^2 - x + 1)$   
 $= 42(x^2 + 3x + x + 3)(x^2 - x + 1)$   
 $= 42[x(x + 3) + (x + 3)](x^2 - x + 1)$   
 $= 2 \times 3 \times 7(x + 3)(x + 1)(x^2 - x + 1)$   
? GCD of  $p(x)$  and  $q(x)$   
 $= 14(x + 1)(x^2 - x + 1) = 14(x^3 + 1)$ 

10. Two bills of Rs 6075 and Rs 8505 respectively are to be paid separately by cheques of the same amount. Find the largest possible amount of each check.

Solution: Largest possible amount of cheque will be the

HCF (6075, 8505).

We can write  $8505 = 6075 \times 1 + 2430$ 

Since, the remainder 2430 ? 0 again applying division concept we can write

 $6075 = 2430 \times 2 + 1215$ 

Again remainder 1215 ? 0

So, again applying the division concept we can write

$$2430 = 1215 \times 2 + 0$$

Here the remainder is zero

So, HCF = 1215

Therefore, the largest possible amount of each cheque will be 1215.

11. A garden consists of 135 rose plants planted in a certain number of columns. There are another set of 225 marigold plantlets which is to be planted in the same number of columns. What is the maximum number of columns in which they can be planted?

Solution: To find the maximum number of columns we need to find the HCF (135, 225)

We can write,  $225 = 135 \times 1 + 90$ 

Since, the remainder 90 ? 0 . So, again applying division concept, we can write,  $135 = 90 \times 1 + 45$ 

The Remaining 45 ? 0 again using division concept, We have,

 $90 = 45 \times 2 + 0$ 

Since, the remainder is 0. So, HCF = 45

Therefore, 45 is the maximum number of columns in which the plants can be planted.

12. A watch ticks 90 times in 95 seconds and another watch ticks 315 times in 323 seconds. If both the watches are started together, how many times will they stick together in the first hour?

Solution: The first watch ticks every  $\frac{95}{90}$  seconds.

They will stick together after (LCM. of  $\frac{95}{90} & \frac{323}{315}$ ) seconds.

Now, LCM of  $\frac{95}{90}$  and  $\frac{323}{315} = \frac{\text{LCM of 95, 323}}{\text{HCF of 90, 315}} = \frac{19 \times 5 \times 17}{45}$ 

The number of times they will tick in the first 3600 seconds

 $= 3600 \div \frac{19 \times 5 \times 17}{45} = \frac{3600 \times 45}{19 \times 5 \times 17} = 100\,\frac{323}{223}$ 

Once they have already ticked in the beginning;

so in 1 hour they will tick 100 + 1 = 101 times.

Here, are some easy tips and tricks for you to solve HCF and LCM questions quickly, easily, and efficiently in competitive exams.

HCF and LCM Tips and Tricks and Shortcuts

• The H.C.F of two or more numbers is smaller than or equal to the smallest number of given numbers

• The smallest number which is exactly divisible by a, b and c is L.C.M of a, b, c.

• The L.C.M of two or more numbers is greater than or equal to the greatest number of given numbers.

• The smallest number which when divided by a, b and c leaves a remainder R in each case. Required number = (L.C.M of a, b, c) + R

• The greatest number which divides a, b and c to leave the remainder R is H.C.F of (a -R), (b -R) and (c -R)

• The greatest number which divide x, y, z to leave remainders a, b, c is H.C.F of (x – a), (y – b) and (z – c)

• The smallest number which when divided by x, y and z leaves remainder of a, b, c (x – a), (y - b), (z - c) are multiples of M Required number = (L.C.M of x, y and z) – M

#### **Related Pages**

- How to Solve HCM and LCM Problems Quickly
- Formulas of HCF and LCM
- Questions of HCF and LCM

Type 1: Tips and Tricks and Shortcuts to find the greatest or smallest number

Question 1. Find the greatest 5 digit number divisible by 5, 15, 20, and 25

Options

- A. 99900
- B. 99000
- C. 99990
- D. 90990

Solution:

LCM of 5, 15, 20, and 25 is 300

The greatest 5 digit number is 99999

99999300

300

99999 = 99

Therefore, required number 99999 - 99 = 99900

Correct option: A

Type 2: Find the numbers, sum of numbers, product of numbers if

- Their ratio and H.C.F. are given.
- Product of H.C.F. and L.C.M are given

Question 2. The product of two numbers is 3888. If the H.C.F. of these numbers is 36, then the greater number is:

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Options

A. 110

B. 108

C. 36

D. 120

Solution:

Let the two numbers be 36x and 36y

Now, 36x \* 36y = 3888  $xy = 388836 \times 36$   $36 \times 363888xy = 3$ Now, co-primes with product 3 are (1, 3). Therefore, the required numbers are 36 \* 1 = 36 36 \* 3 = 108Therefore the greatest number is 108 Correct option: B

Type 3: How to Solve HCF, LCM Problems related to finding the biggest container to measure quantities

Question : Suppose there are three different containers contain different quantities of a mixture of Sugar and rice whose measurements are 403grams,434 grams and 465 grams What biggest measure must be there to measure all the different quantities exactly?



Type 5 : Tips , tricks and Shortcuts of HCF, LCM Problems related to Bell ring.

Question: Six bells commence tolling together and toll at intervals of 2, 4, 6, 8 10 and 12 seconds respectively. In 30 minutes, how many times do they toll together ? Options :

A. 8

- B. 16
- C. 9
- D. 10

Solution :L.C.M. of 2, 4, 6, 8, 10, 12 is 120. Hence, the bells will toll together after every 120 seconds(2 minutes). Therefore, in 30 minutes ,number of times bells toll together is 302+1230+1 = 16Correct Option B

Type 6 : Tips , tricks and Shortcuts of HCF, LCM Problems related to Circle Based Runner Problem.

Question: Two people P and Q start running towards a circular track of length 400 m in opposite directions with initial speeds of 10 m/s and 40 m/s respectively. Whenever they meet, P's speed doubles and Q's speed halves. After what time from the start will they meet

Options

for the third time?

- A. 30 seconds
- B. 26 seconds
- C. 10 seconds
- D. 20 seconds

Solution :Time taken to meet for the 1st time= 40040+10 40+10400=8 sec. Now P's speed = 20m/s and Q's speed=20 m/s. Time taken to meet for the 2nd time= 40020+20 20+20400 = 10 sec. Now P's speed =40 m/sec and Q's speed = 10 m/sec. Time taken to meet for the 3rd time= 40010+4010+40400=8 sec. Therefore, Total time= (8+10+8) = 26 seconds. Correct Option B Question. 3 Find HCF of 12 and 16.

Options

(A) 5

(B) 4

(C) 12

(D) 16

Solution Find the difference between 12 and 16. The difference is 4. Now, check whether the numbers are divisible by the difference. 12 is divisible by 4 and 16 is divisible by 4.Hence, the HCF is 4.

Correct Option B

Question. 4 Find HCF of 18 and 22.

Options

- (A) 2
- (B) 4
- (C) 18
- (D) 36

Solution: Find the difference between 18 and 22. The difference is 4. Now, check whether the numbers are divisible by the difference. Both 18 and 22 are not divisible by 4. So take the factors of the difference. The factors of 4 are 2\*2\*1. Now, check whether the numbers are divisible by the factors. 18 and 22 are divisible by factor 2.

Hence, the HCF is 2.

Note: If there are more than two numbers, take the least difference.

Correct Option(A)

Tips and Tricks and Shortcuts to find LCM easily

Question 5 Find LCM of 2,4,8,16.

Options

- (A) 16
- (B) 18
- (C) 12
- (D) 2

Solution Factorize of above number

2 = 2

8 = 2316 = 24

Choose the largest number. In this example, the largest number is 16. Check whether 16 is divisible by all other remaining numbers. 16 is divisible by 2, 4, 8. Hence, the LCM is 16. Correct Option (A)

Question 6 Find the LCM of 2,3,7,21.

Options

(A) 21

(B) 44

- (C) 36
- (D) 42

Solution Choose the largest number. The largest number is 21. Check whether 21 is divisible by all other remaining numbers. 21 is divisible by 3 and 7 but not by 2. So multiply 21 and 2. The result is 42. Now, check whether 42 is divisible by 2, 3, 7. Yes, 42 is divisible. Hence, the LCM is 42.

6

Correct Option (D)



# **Ratio And Proportion**

#### **Definition of Ratio:-**

Ratio is a comparison of two numbers (quantities) by division. The ratio of 'a' to 'b' is written as "a:b". In the ratio a:b, a and b are terms of the ratio, "a" is the antecedent and "b" is the consequent.

#### **Proportion:-**

A proportion is an expression which states that two ratios are equal.

Each quantity in a proportion is called is its term or its proportional.

The first term and the last term are called extremes, whereas the second and third terms are called middle terms (or means).

when four quantities are in proportion, the last quantity is said to be fourth proportion, to the other terms and also we find,

Product of middle terms = Product of extreme terms

 $\bullet \qquad \text{If a:b = c:d, } \qquad bc : ad$ 

 $2^{nd}$  term x  $3^{rd}$  term =  $1^{st}$  term x  $4^{th}$  term

# Dividing a given number in the given ratio:-

Let A be a given number. The given ratio is a:b. Here A is to be divided in the ratio a:b.

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It implies that A is divided into two parts such that

Value of  $1^{st}$  part: Value of  $2^{nd}$  part = a:b

 $/1^{\text{st}} \text{ part} = \frac{a}{a+b} \times A$ 

 $2^{nd} part = \frac{a}{a+b} \times A$ 

Since A is divided into two parts, so first part + second part = A

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# Fourth Proportional:-

• If a:b: :c:d or in other words a:b = c:d, then the quantity of 'd' is called the fourth proportional to a, b and c.

/ a : b = c : d $\frac{a}{b} = \frac{c}{a}$ ad = bc

# Third Proportional:-

 $\bullet$  The third proportional of a proportion is the second term of the mean terms.

/ a : b: :b : c a : b = b : c  $\frac{a}{b} = \frac{b}{c}$  $ad = b^{2}$  $b^{2} = ac$ 

## Mean proportional:-

The Mean proportional between the two terms of a ratio in a proportional is the square root of the product of these two.

$$/\sqrt{ab}$$
1) If a:b = 2:3, b:c = 4:5 then a:b:c =   
a) 9:11:15 b) 9:17:18 c) 12:15:25 d) 8:12:15  
Answer: d) 8:12:15  
Solution:  
a:b = 2:3  
b:c = 4:5 (2)  
(1) x 4 a:b = 2x4 : 3x4  
(2) x 3 b:c = 4x3 : 5x3  
a:b = 8:12  
b:c = 12:15  
a:b:c = 8:12:15  
2) If a:b = 3:5, b:c = 4:9 then a:b:c =   
a) 10:20:43 b) 12:22:45 c) 12:20:45 d) 9:17:35  
Answer: c) 12:20:45  
Solution:  
a:b = 3:5 (1)  
b:c = 4:9 (2)  
(1) x 4 a:b = 3x4 : 5x4  
(2) x 5 b:c = 4x5 : 9x5  
a:b = 12:20  
b:c = 20:45  
a:b:c = 12:20:45



6) If a:t	b = 2:3, $b:c = 4:5$ and $c:c$	d = 6:7 then $a:b:c:d =$	
a) 16:24:30:	b) 8:15:30:32	c) 12:25:30:3	6 d) 12:24:28:33

#### Answer: a) 16:24:30:35

![](_page_30_Figure_2.jpeg)

a:b = 4:5

![](_page_31_Figure_0.jpeg)

9) If a:b = 5:6, b:c = 9:10 and c:d = 4:7 then a:b:c:d = \_\_\_\_\_
a) 5:9:10:7b) 15:18:20:35
c) 5:10:12:15 d) 15:18:24:35
Answer: b) 15:18:20:35
Solution:

![](_page_31_Figure_2.jpeg)

10) If a:b = 1:2, b:c = 2:4 and c:d = 3:8 then a:b:c:d = \_\_\_\_\_
a) 3:6:12:32b) 4:7:10:12
c) 1:2:3:8
d) 4:6:2:3
Answer: a) 3:6:12:32

Solution:

a:b = 1:2 (1)  $\longrightarrow$ b:c = 2:4 (2)  $\longrightarrow$ c:d = 3:8 (3)  $\longrightarrow$ (1) x 3a:b = 1x3 : 2x3 (2) x 3b:c = 2x3 : 4x3 (3) x 4c:d = 3x4 : 8x4a:b = 3:6 b:c = 6:12c:d = 12:32a:b:c:d = 3:6:12:32

# **Simple Interest & Compound Interest**

#### **I. Simple Interest**

Definition:

 $\triangleright$ Interest is the additional money paid for the usage of a certain money.

 $\geq$ The money borrowed is called the Principles.

 $\triangleright$ The sum of interest and principles is called the amount.

Simple interest: Definition-

 $\triangleright$ If the interest is calculated on same amount of money, it is called the simple

interest.(S.I)

Simple interest will be the same for all the years.  $\geq$ 

 $\triangleright$ If P is the principal, R is the rate of interest; T6 is the time and S.I the simple interest then.

Simple interest = PTR  
Amount = 
$$P\left(1 + \frac{TR}{100}\right)$$

1. Find the simple interest on ₹ 32,000 at 7 % per annum for 4 years.

a) ₹ 7260

b) ₹ 8490 Answer:d) ₹ 8960

d) ₹ 8960

Solution:

Principal (P) ₹ 32,000 =

Rate of Interest (R) =7% per annum

=

No. of years (N) = 4 years

Simple Interest

100

PNR

<u>32000 x 4 x 7</u> =100

Simple Interest ₹ 8960 =

2. Arjun borrowed a sum of ₹ 5000 from a bank at 5% per annum. Find the interest and amount to be paid at the end of three years.

a) ₹ 350> ₹ 5350 b) ₹ 650, ₹ 5650 c) ₹ 750> ₹ 5750 d) ₹950>₹5950 Answer: c) ₹ 750> ₹ 5750 Solution: ₹ 5000 Principal (P) = Rate of Interest (R) =5% No. of years (N) =3 years Simple Interest = <u>PNR</u> 100 <u>5000 x 3 x 5</u> =100 ₹750 Amount = Principal + S.I 5000 + 750₹ 5750 3. Vignesh has paid simple interest on a certain sum of 3 years at 8 % per annum is ₹ 3600. Find the sum. a) ₹ 15>000 b) ₹ 13,000 c) ₹ 18>000 d) ₹ 18>850 Answer: a) ₹ 15>000 ରୋର୍ଡ୍ଡା Solution: 8 % per annum Rate of Interest (R) = Time (N) =3 years Simple Interest <u>PNR</u> = 100 <u>P x 3 x 3</u> 3600 = 100 600 1200 25  $3600 \times 100 =$ Р <del>3</del> x <del>8</del> 2 Р 15,000 =

Therefore, vignesh has borrowed a sum of ₹15>000.

4. Find the simple interest on ₹ 25,000 at 6 % per annum for 2 years.

a) ₹ 2680	b) ₹ 3000	c) ₹ 3550	d) ₹3790
Answer: b) ₹ 3000			
Solution:			
Given that,			
	Principal (P) =	₹ 25,000	
No. of	Interest (R) =	6 %	
No. of	years (N) =	2 years	
	Simple Interest =	<u>PNR</u>	
		100	
	=	<u>250<del>00</del> x 2 x 6</u>	
		100	
	Simple Interest =	₹ 3000	
	10/1	nal I	
5. Find the simple int	erest on ₹14,000 at	10% per annum for 5 years.	
a) ₹ 6400	b) ₹ 670 <mark>0</mark>	<mark>c)</mark> ₹7000	d) ₹ 7300
Answer: c) ₹ 7000	7 E 🔐		
Solution:			
Given that,			
Princip	pal (P) =	₹14,000	
Rate o	f Interest (R) =	10 %	
No. of	years (N) 😑	5 years 💿	
đ	Simple Interest =	PNR	
	TU:	100	
	100 <u>ED</u>	<u>140<del>00</del> x 5 x 10</u> 1 <del>00</del>	
	Simple Interest =	₹ 7000	
6. Anbu has paid sim	ple interest on a certa	ain sum of 5 years at 5% per an	num is ₹ 500. Find

the sum.

a) ₹ 1880 b) ₹ 2000 c) ₹ 2200 d) ₹ 2600

Answer: b) ₹ 2000

Solution:

Given that,

Rate of Interest (R) = 5%

![](_page_35_Figure_0.jpeg)

Therefore, Anbu has borrowed a sum of  $\gtrless$  2>000.

7. Vishnu has paid simple interest on a certain sum for 3 years at 12% per annum is  $\gtrless$  840.

![](_page_35_Figure_3.jpeg)

Therefore, Vishnu has borrowed a sum of ₹2333.33.

8. Given that simple interest on a certain sum of money is ₹ 4016.25 at 9% per annum in 5 years. Find the sum of money.

a) ₹ 8925	b) ₹ 8875	c) ₹ 8575	d) ₹8635
Answer: a) ₹ 8925			
Solution:

Given that,

Let P be the principal amount.



10. Devi deposited ₹ 10000 for 4 years at a rate of 6% per annum. Find the interest and amount Devi got.

a) ₹ 2225> ₹ 12225 b) ₹ 2400, ₹12400 c) ₹ 2200> ₹ 12200 d) ₹2800>₹12800 Answer: b) ₹ 2400> ₹ 12400 Solution: Given that, Principal (P) =₹ 10,000 Rate of Interest (R) 6 % =Time (N) =4 years Simple Interest = <u>PNR</u> 100 10000 x 4 x 6 100 Simple Interest = ₹ 2400 Amount Principal + S.I = 10000 + 2400= Amount = ₹12400 11. In that time will ₹1860 will become ₹ 2641.20 at 12% per annum simple interest? a) 2 years 4 months b) 2 years 8 months c) 3 years 6 months d) 3 years 9 months . Answer: c) 3 years 6 months ରରାର୍ଡ୍ଡାଷ୍ମ Solution: ₹2641.20 Amount ₹1860 Principal = Rate of Interest 12% = Simple Interest Amount - Principal =2641.20 - 1860= ₹781.20 = Simple Interest <u>PNR</u> =100 781.20 = <u>1860 x N x 2</u>

100

```
0.7 \ \frac{65.15}{781.20 \ x \ \frac{100}{12}} = N
\frac{1860 \ x^{12} \ 1}{N} = 3.5 \ years
Time (N) = 3 years 6 months
```

12. In what time will ₹8000 amount to ₹8360 at 6% annum simple interest?

a) 8 months b) 9 months c) 1 <sup>1</sup>/<sub>4</sub> years d) 1 <sup>1</sup>/<sub>2</sub> years Answer: b) 9 months Solution: ₹ 8000 Principal ₹ <mark>8</mark>360 Amount Rate of Interest (R) <mark>6%</mark> Amount Principal + S.I = 8360 8000 + S.I-8360 - 8000 S.I S.I ₹360 Simple Interest PNR 100 360 8000 x N x 6 = 100 63 බබාහිනු 360 x <del>100</del> Ν 8000 x 6 1 4

N =  $\frac{3}{4}$  years (or) 9 months

```
Time (N) = 9 months
```

## **II. Compound Interest**

Definition

> The interest on a loan or deposit calculated based on both the initial amount and previous interest payments from previous periods is known as compound interest (or compounding interest)

Compound interest also known as "interest on interest", works in the same way.

Total amount of principal and interest in future - principal amount at present
 =compound interest.

- > Interest may be compounded yearly, half yearly and quarterly.
- ➢ Compound yearly,

$$Amount = P \begin{pmatrix} 1 + \underline{R}^{N} \\ 100 \end{pmatrix}$$

Where

 $\triangleright$ 

P = Principal

- N = Number of years
- R = Rate of interest
- $\succ$  Compounded Half yearly,

Amount = 
$$P \begin{pmatrix} 1 + \underline{R/2}^{2N} \\ 400 \end{pmatrix}$$
  
Compounded quarterly,  
Amount =  $P \begin{pmatrix} 1 + \underline{R/4}^{4N} \\ 100 \end{pmatrix}$   
d the compound interest on ₹ 10000 for 2 years at 6%

1. Find the compound interest on ₹ 10000 for 2 years at 6% per annum. Compounded annually.

a) ₹ 936 b) ₹ 1136 c) ₹ 1036 d) ₹ 1236  
Answer: d) ₹ 1236  
Solution:  
Given that  
Principal = ₹ 10000  
No. of years = 2 years  
Rate of Interest = 6% per anum  
Amount = 
$$P\left(\frac{1 + \mathbb{R}^{N}}{100}\right)$$
  
=  $10000\left(\frac{1 + 6^{2}}{100}\right)$   
=  $10000\left(\frac{106^{2}}{100}\right)$ 

 $= 10000 \text{ x } \underline{106} \text{ x } \underline{106}$ 

100100

Amount	=	₹11236
Compound Interest	=	Amount - Principal
	=	11236 - 10000
Compound Interest	=	₹2136

2. Find the compound interest on ₹ 1200 for 2 years at 6% per annum compounded annually.

a) ₹ 148.42	b)	₹ 156.78
c) ₹ 139.61	d)	₹ 172.21

Answer: a) ₹ 148.42



1348.40 - 1200

₹ 148.42

=

=

**Compound Interest** 

3. Find the compound Interest on ₹ 8000 at 15% per annum for 2 years 4 months, compounded annually.



4. Find the compound interest paid when a sum of ₹ 10,000 is invested for 1 year and 3 months at 8 ½ % per annum, compounded annually.

	a) ₹ 1017.28		b)	₹ 1030.56
	c) ₹ 1077.28		d)	₹ 1080.56
Answe	er: d) ₹ 1080.5	6		
Solutio	on:			
	Given that,			
	Principal	(P)	=	₹ 10000
	No. of years (	N)	=	1 year 3 months (or) $1 \frac{3}{12}$ (or) $1 \frac{14}{4}$ years

Rate of Interest ( R	) =	$8\frac{1}{2}$	%
nane of meetest ( it	/	0,2	/0

For first year,

Interest	=	<u>PNR</u>
		100
	=	<u>10000 x 1 x 8 ½</u>
		100
	=	100 x 1 x <u>17</u>
		2
	=	₹ 850
Amount	=	Interest + Principal
	=	850 + 10000
	=	₹ 10850

For second year, principal will be amount of previous year (since interest is





Compound Interest paid after 1 year and 3 months is  $\gtrless$  1080.56.

5. A sum of  $\gtrless$  13500 is invested at 16% per annum compound interest for 5 years. Calculate the amount at the end of the first year.

a) ₹ 15660	b)	₹17890
c) ₹ 19535	d)	₹ 20990
Answer: a) ₹ 15660		

Solution:



$$100 100 \sqrt{121} = \begin{pmatrix} 1+R \\ 100 \end{pmatrix} 1100 100 111 = \begin{pmatrix} 1+R \\ 100 \end{pmatrix} 111 = \begin{pmatrix} 1+R \\ 100 \end{pmatrix} 111 = R 100 100 100 100 100 R = 100 R = 100 10$$



/ Rate of Interest per annum = 10%

7. At what rate of compound interest per annum a sum of ₹ 30000 becomes ₹34347 in 2 years?

a) 5.5%	b) 4.6%	IV
c) 7%	d) 9.5%	
Answer: c) 7%	114	Y
Solution:	Man Deres	

Let R% be the rate of interest per annum.

Given,

Principal (P) = ₹ 30000  
Amount = ₹ 34347  
Time (N) = 2 years  
Amount = PI(+
$$\underline{R}^N$$
)  
100  
34347 = 30000(+ $\underline{R}^2$ )  
 $\frac{34347}{3000}$  = [1 + $\underline{R}^2$ )  
100

$$\frac{11449}{10000} = \begin{pmatrix} 1 + R^{2} \\ 100 \end{pmatrix}$$

$$\sqrt[3]{11449} = \begin{pmatrix} 1 + R \\ 100 \end{pmatrix}$$

$$\frac{107}{100} = \frac{1 + R}{100}$$

$$\frac{107}{100} = \frac{R}{100}$$

$$\frac{107 - 100}{107} = \frac{R}{100}$$

$$\frac{107}{2} = \frac{R}{100}$$

$$R = 7\%$$

$$R = 7\%$$
8. At what rate of nucrest (R) = 7\%
8. At what rate of compound interest per annum a sum of ₹ 25000 becomes ₹ 35123.20 in 3 years?  
a) 12% b) 13.5%  
c) 16% d) 18%
Solution:  
Let R% be the rate of interest per annum.  
Given,  
Principal (P) = ₹ 25000  
Amount = ₹ 35123.20  
Time (N) = 3 years  
Amount = P[+R^{N}]\_{100}
$$35123.20 = 25000(+R^{3})$$

35123.20

<u>35123.20</u>

25000

=

=

100

 $\left[1 + \underline{R}^3\right]$ 



9. At what rate of compound interest per annum a sum of ₹ 8000 becomes ₹ 8820 in 2 years?

a) 2.7%	b)	3.2%
c) 4.8%	d)	5%

Answer: d) 5%

Solution>

Let R% be the rate of interest per annum.

Given,

Principal	(P)	=	₹ 8000
Amo	ount	=	₹ 8820
Time	e (N)	=	2 years



10. At what rate of compound interest per annum a sum of ₹ 20000 becomes ₹ 26620 in 3 years?

a) 10%	b)	15%	
c) 17%		d)	21%

Answer: a) 10%

Solution:

Let R% be the rate of interest per annum.

Given,



11. In how many years will ₹ 3375 become ₹ 4096 at 6 2/3 per annum if the interest is compounded annually.

a) 2 years	b)3 y	ears		c) 1.5 years	d) 1 year
Answer: b) 3	years				
Solution:					
	Principal	(P)	=	₹ 3375	
	Amo	unt	_	₹ 4096	



12. In how many years ₹ 3200 become ₹ 3362 at 2.5% per annum if the interest is compounded annually.

a) 2.5 years	b)	2 year	s. Oolo
c) 1.5 years	d)	3 year	rs
Answer: b) 2 years			
Solution:			
Principal	(P)	=	₹ 3200
Amount		=	₹ 3362
Rate of Interest		=	2.5 %
If compounded annually,			
Amount	=	P 🛛 1	$+\underline{\mathbf{R}}^{\mathrm{N}}$
		Ĺ	100
3362	=	3200	$(1 + 2.5^{N})$
			100

$$3362 = 3200 \left(1 + 5/2^{N}\right)$$

$$100$$

$$3362 = 3200 \left(1 + 5^{N}\right)$$

$$3362 = 3200 \left(\frac{205}{200}^{N}\right)$$

$$3362 = 3200 \left(\frac{41}{40}\right)^{N}$$

$$\frac{3362}{260} = \left(\frac{41^{N}}{40}\right)$$

$$\frac{3362}{1681} = \left(\frac{41^{N}}{40}\right)^{N}$$

$$\frac{1681}{1600} = \left(\frac{41}{40}\right)^{N}$$

$$N = 2$$
Number of years = 2 years.
Time And Work
can do a piece of work in 10 days. B can do a same work at 15 days. How make

1. A can do a piece of work in 10 days. B can do a same work at 15 days. How many days can the mark joining together? a)  $9\frac{1}{2}$  days b) 8 days c) 6 days d)  $7\frac{1}{2}$  days Answer : C) 6 days Solution : A's one day work =  $\frac{1}{10}$ B's one day work =  $\frac{1}{15}$ 

(A+B)'S one day work = 
$$\frac{1}{10} + \frac{1}{15}$$
  
=  $\frac{15+10}{150}$   
=  $\frac{25}{150}$   
=  $\frac{1}{6}$ 

### Number of days A & B can

#### do the work

2.A can do a piece of work in 12 days. B can do the same work in 18 days. How many days can the work joining together?

6 days.

a)  $6\frac{3}{4}$  days b)  $7\frac{1}{5}$  days c)  $6\frac{1}{2}$  days d)  $7\frac{1}{3}$  days Answer : b)  $7\frac{1}{5}$  days Solution :  $\frac{1}{12}$ A's one day work =1 12 B's one day work = $\frac{1}{12} + \frac{1}{18}$ (A+B)'S one day work 18<mark>+12</mark> 216 30 216 5 36  $\frac{36}{5}$  or  $7\frac{1}{5}$  days. Number of days A & B can do the work together =

=

3.A can do a piece of work in 18 days. B can do the same work in 24 days. How many days can the work joining together?

a) 
$$10\frac{2}{7}$$
 days b)  $10\frac{1}{7}$  days c)  $13\frac{2}{7}$  days d)  $13\frac{1}{7}$  days

Answer : b)  $10\frac{2}{7}$  days

Solution :

A's one day work =  $\frac{1}{18}$ B's one day work =  $\frac{1}{24}$ (A+B)'S one day work =  $\frac{1}{18} + \frac{1}{24}$ =  $\frac{4+3}{72}$ =  $\frac{7}{72}$ 

Number of days A & B can

do the work together =  $\frac{72}{7}$  or  $10\frac{2}{7}$  days.

4.A can do a piece of work in 15 days. B can do the same work in 30 days. How many days can the work joining together?

can the work joir	ing together?		
a) 27 days	b) 12 days	c) 10 days	d) 21 days
Answer : b) 10 c	lays		
Solution :			
	A's one day work =	<u>1</u> 15	
	B's one day work =	$\frac{1}{30}$	
(A+B)'S one day	work =	$\frac{1}{15} + \frac{1}{30}$	
	=	$\frac{2+1}{30}$	
	=	3	
	19	$\int_{\frac{1}{10}}^{30}$	
Number of days	s A & B can		60
do the work tog	ether =	10 days.	
	9		
5.A can do a piec	ce of work in 21 da <mark>ys. B</mark>	can do the same work	s in 30 days. How many days
can the work join	ning together?		3.41
a) 27 $\frac{7}{11}$ days	b) $12\frac{2}{9}$ days	c) $12\frac{1}{8}$ days	d) $12\frac{6}{17}$ days
Answer : b) $12\frac{6}{1}$	days		
Solution :	11mm		SIL
	A's one day work =	$\frac{1}{21}$ 0616	09
	B's one day work $=$	$\frac{1}{30}$	
(A+B)'S one day	work =	$\frac{1}{21} + \frac{1}{30}$	

Number of days A & B can

do the work together =  $\frac{210}{17}$  (or)  $12\frac{6}{17}$  days.

=

=

10+7

210

 $\frac{17}{210}$ 

6.A and B join together can do a piece of work at 6 days. A can alone do a work at 18 days. How many days can do the same work B alone?



7.A and B join together can do a piece of work at 8days. A can alone do a work at 20 days. How many days can do the same work B alone?

a)  $13\frac{1}{4}$  days Answer : b)  $13\frac{1}{3}$  days Solution : (A+B)'s one day work =  $\frac{1}{8}$ A's one day work =  $\frac{1}{20}$ B's one day work =  $\frac{1}{8} - \frac{1}{20}$   $= \frac{5-2}{40}$  $= \frac{3}{40}$ 

Number of days B can

do the work  $=\frac{40}{3}$  or  $13\frac{1}{3}$  days.

8.A and B join together can do a piece of work at 10 days. A can alone do a work at 20 days. How many days can do the same work B alone? a) 12 days b) 20 days c) 19 days d) 15 days Answer : b) 20 days Solution :  $\frac{1}{10}$ (A+B)'s one day work =  $\frac{1}{20}$ A's one day work =  $\frac{1}{10} - \frac{1}{20}$ B's one day work = 2-1 = 20 1 = 20 Number of days B can do the work 20 days. = 9.A and B join together can do a piece of work at 8 days. A can alone do a work at 16 days. How many days can do the same work B alone? a) 12 days b) 14 days c) 16 days d) 10 days Answer : C) 16 days Solution : 1 8 (A+B)'s one day work 1 A's one day work බොබාමු 16 1 8 1 B's one day work 16  $\frac{2-1}{16}$ =  $\frac{1}{16}$ = Number of days B can do the work 16 days. =

10A and B join together can do a piece of work at 8 days. A can alone do a work at 16 days. How many days can do the same work B alone?

a)  $39\frac{1}{6}$  days b) 37 days c)  $33\frac{3}{4}$  days d) 40 days Answer : b)  $33\frac{3}{4}$  days Solution :

=	$\frac{135}{4}$ (or) 33 $\frac{3}{4}$ days
=	4 135
=	<u>9–5</u> 135
=	$\frac{1}{15} - \frac{1}{27}$
=	$\frac{1}{27}$
=	$\frac{1}{15}$
	= = = =

## **Reasoning Time Distance**

1. Q travels towards East. M travels towards North.S and T travel in opposite directions. T travels towards right of Q. Which of the following is definitely true?

(a) M and S travel in theopposite directions.

(b) S travels towards West.

(c) T travels towards North.

(d) M and S travel in the same direction.

2. P, Q, R, S and T are sitting around a circular table. R is to the right of P and is second to the left of S. T is not between P and S. Who is second to the left of R?

(a) S

(c) 0

(d) data inadequate

(b) T

3. Of the five villages P, Q, R, S and T situated close to each other, P is to west of Q, R is to the south of P. T is to the north of Q, and S is to the east of T. Then, R is in which direction with respect to S?

(a) North-West (b) South-East

(c) South-West (d) Data Inadequate

4. M is to the East of D, F is to the South of D and K is to the West of F. M is in which direction with respect to K?

- (a) South-West (b) North-West
- (c) North-East (d) South-East

5. After 4 pm on a sunny day when Ramesh was returning from his school, he saw his uncle coming in the opposite direction. His uncle talked to him for some time. Ramesh saw that the shadow of his uncle was to his right side. Which direction was his uncle facing during their talk?

(a) North

(c) East (d) Data inadequate

6. A and B are standing at a distance of 20 km from each other on a straight East-West road.

A and B start walking simultaneously, eastwards and westwards respectively, and both cover a distance of 5 km. Then A turns to his left and walks 10 km. 'B' turns to his right and walks 10 km and at the same speed. Then both turn to their left and cover a distance of 5 km at the same speed. What will be the distance between them?

(a) 10km

(b) 5km

(b) South

(c) 20km

(d) 25 km

7. Alok walked 30 metres towards east and took a right turn and walked 40 metres. He again took aright turn and walked50 metres. Towards which direction is he from his starting point?

(a) South

(b) West

(c) South-West (d) South-East

8. Ruchi's house is to the right of Vani's house at a distance of 20 metres in the same row facing North. Shabana's house i in the North- East direction of Vani's house at a distance of 25 metres. Determine that Ruchi's house is in which direction with respect of Shabana's house?

(a) North-East (b) East (c) South (d) West

(c) South-East

9. Y is to the East of X, which is to the North of Z. If P is to the South of Z, then P is in which direction with respect to Y?

(a) North (b) South

(d) None of these

10. One afternoon, Manisha and Madhuri were talking to each other face to face in Bhopal on M.G. Road. If Manisha's shadow was exactly to the left of Madhuri, which direction was Manisha facing?

(a) North (b) South

(c) East (d) Data inadequate

'X' started walking straight towards South, He walked a distance of 5 metres and then took a left turn and walked a distance of 3 metres. Then he took a right turn and walked a distance of 5 metres again. 'X' is facing which direction now?

(a) North-East (b) South

(c) North (d) South-West

If A is to the south of B and C is to the east of B, in what direction is A with respect to C? 11.

- (a) North-east (b) North-west
- (c) South-east (d) South-west

One morning after sunrise, Gopal was facing a pole. The shadow of the pole fell exactly 12. to his right. Which direction was he facing?

(a) South (b) East

(c) West (d) Data inadequate

A boy rode his bicycle northwards, then turned left and rode one km and again turned 13. left and rode 2 km. He found himself exactly one km west of his starting point. How far did he ride northwards initially?

(a) 1 km

(b) 2km

(c) 3 km (d) 5 km.

Ravi wants to go to the university which is opposite to theatre. He starts from his home 14. which is in the East and come to a crossing. The road to the left ends is a theatre, straight ahead is the hospital- In which direction is the university?

(a) North

(c) East

(d) West

(b) South

A rat runs 20' towards east and turns to right, runs 10' and turns to right, runs 9' and 15. again turns to left, runs 5 and then to left, runs 12' and finally turns to left and runs 6'. Now, which direction is the rat facing?

(a) East

(b) West

(c) North

(d) South

(b) North-west

(d) South-west

16. If South-east becomes North, North-east becomes west and so on, what will West ରର୍ଘ୍ୟର୍ଡ୍ହ become?

(a) North-east

(c) South-east

P, Q, R and S are playing a game of carrom. P, R and S, Q are partners. S is to the right 17. of R who is facing west. Then, Q is facing

(a) North (b) South

(c) East (d) West

A and B start walking, from a point, in opposite directions. A covers 3 km and B covers 18. 4 km. Then A turns right and walks 4 km while B turnsleft and walks 3 km. How far is each from the starting point?

- (a) 5 km (b) 4km
- (c) 10km (d) 8km

19. Anuj started walking positioning his back towards the sun. After sometime, he turned left, then turned right and then towards the left again. In which direction is he going now?

- (a) North or South (b) East or West
- (c) North or West (d) South or West

20. From her home, Prema wishes to go to school. From home, she goes towards North and then turns left and then turns right, and finally she turns left and reaches school. In which direction her school is situated with respect to her home?

- (a) North-East (b) North-West
- (c) South-East (d) South-West

### **Answer Key**

			П	a		
Γ	1	(d)	9	(d)	17	(c)
	2	(c)	10	(a)	18	(a)
	3	(c)	11	(b)	19	(a)
	4	(c)	12	(d)	20	(a)
	5	(b)	13	(a)	1	Ξì
2	6	(a)	14	(b)	45	
	7	(c)	15	(a)		ΞĹ
	8	(c)	16	(c)		S A
			ACCOUNT OF			

## HINTS & EXPLANATIONS

1.We have been given that Q travels towards East and M travels towards North. Now, T travels towards right of Q implies that T travels towards South. Hence, S travels towards North (because S and T Travel in opposite directions). Therefore, it is definitely true that M and S travel in the same direction i.e., North.





Hence, R is to the South-West with respect to S

4. (C)



M is to the North-East of K.

## 5.(b)

After 4 pm the shadow will be towards East. Now, East is to the right of Ramesh. So Ramesh faces North. And his uncle, who is opposite him, faces South.

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### 6. (a)



7. (c)





9. (a) In the afternoon the sun is in the west. Hence the shadow is in the east. Now, east is to the left of Madhuri. So, Madhuri is facing south. Therefore, Manisha, who is face to face with Madhuri, is facing north.

10. (a) In the afternoon the sun is in the west. Hence the shadow is in the east. Now, east is to the left of Madhuri. So, Madhuri is facing south. Therefore, Manisha, who is face to face with Madhuri, is facing north.





12. (d) Clearly, comparing the direction of A w.r.t. C in thes econd diagram with that in the first diagram, A will be south-west of C.



13. (a) The Sun rises in the east. So, in morning, the shadow falls towards the west. Now, shadow of pole falls to the right of Gopal. Therefore, Gopal's right side is the west. So, he is facing South.

14. (b) Clearly, the boy rode from A to B, then to C and finally up to D. Since D lies to the west of A, so required distance =AB = CD = 2 km.



15. (a) Starting from his house in the East, Ravi moves west wards. Then, the theatre, which is to the left, will be in the South. The hospital, which is straight ahead, will be to the West. So, the University will be to the North.



16.

(c) The movements of rat are as shown in figure. Clearly, it is finally walking in the direction FG i.e. North.



19 (a) Here, O is starting point.



20(a) Clearly, there are two possible movements of Anuj as shown below:



### **Number Series**

1. BDF, CFI, DHL,? (a) CJM (b) EIM (c) EJO (d) EMI FAG, GAF, HAI, 1AH, 2. (c) JAI JAK (b) HAK (d) HAL (a) DILQTYBG? 3. (d) P (a) Η (b) I (c) **J** BC FG JK RS VW 4. (b) OP LM (c) QR(d) NO (a) 5. BYA, CXB, ?, EVD: (a)DVE (b) DCW (c) DXB (d)DWC LXF, MTJ, NPN, OLR, ? 6. (a) PHV(b) PIU (c) PKX (d) PJW 7. YANWY, DFMBD, IKNGI, NPMLN, (?), XZMVX (a) RUMSR(b) SUNQS(c) UWNSU(d) VUMTV 1609 PEXKW, RFWMU, TGVOS, VHUQQ, XITSO? 8. (d) JZSTN (a) ZJSUM(b) YJSUZ(c) ZKSVJ AYBZC, DWEXF, GUHVI, JSKTL, (?), POQPR 9. (a)MQRDN(b) QMONR(c) MQNRO(d) NQMOR 10. ZYYZR, ABVUM, (?), BCUTM, XWABT, CDTSL (a) YXZAS(b) ZYABT(c) XWYZR(d) YXZAB

## **Data Interpretation Exercise**

DIRECTIONS (Qs. 1-5):Study the following table to answer the given questions Percentage of marks obtained by seven students in six subjects

Subject	ENG	HIS	Com	Math	Science	Econ		
(Max,							-	
Mark							-	
↓ Students	(100)	(100)	(100)	(100)	(100)	(100)		
Meera	100	80	50	90	90	60		
Subodh	80	70	80	100	80	40		
Kunal	90	70	60	90	70	70	10	
Soni	60	60	65	<mark>80</mark>	80	80		5
Richu	50	90	62	80	85	95	3	
Irene	40	60	64	70	65	85	E	
Vgay	80	80	35	65	50	<u>75</u>		0
(a) 448	total III		(b) 5	80				V.
(c) $470$			(d) 7	4.6/				
2. what is the	average	e marks	obtaine	a by the	ese seven s	students	in His	story ?
(a) 72.86			(b) 2	7.32	ш (	10-		
(c) 24.86			(d) 2	9.14				
3.How many	student	s have g	ot 60S (	or more	marks in	all thesi	ubjects	s?
(a) One			(b) T	wo				
(c) Three			(d) F	our				
4.What is the	overall	percent	age ofK	unal?				
(a) 64			(b) 6	5				
(c) 75			(d)64	1.24				
5.In which su	bject is	the over	rall perc	centage	thebest?			
(a) Maths			(b) E	conomi	cs			

## DIRECTIONS (Qs. 6-10): Study the following graph carefully and answer the questions

given below:

The following graph shows the percentage growth of Branded and Assembled PCs

6 0 5 0 4 3 0	
2010 2011 2012	2013
6.What is the average percenta	ge growth of sales of Assembled PCs for the given years?
(a) 30	(b) 20 (b) 20 (c)
(c) 40	(d) 35
7.If the Branded PCs sold in 2	011 we <mark>re 100000,how m</mark> any Branded PCs were sold in 2014?
(a) 202800	(b) 15 <mark>6000</mark>
(c) 234000	(d) 3 <mark>00000</mark>
8. What is the difference betwe	en to <mark>tal Branded and total As</mark> sembled PCs sold for the given
years?	
(a) 75000	(b) 750000
(c) 175000	(d) Cannot be determined
9.In which year is the difference	ce in the growth between Branded and Assembled PCs
lowest'?	iso og
(a) 2010	(b) 2013
(c)	2014 (d) None of these
10.For Assembled PCs sale, w	hich year is the per cent growth the highest compared to
previous year'?	
(a) 2014	(b) 2011
(c) 2013	(d)Cannot be determined

**DIRECTIONS**(Qs.11-15):Read the following table and answer the questions.

Year	Government	Private
2007-2008	3900	-
2008-2009	29400	-
2009-2010	90000	-
2010-2011	230000	12000
2011-2012	520000	120000
2012-2013	1060000	450000
2013-2014	1550000	950000

11.In which period the percentage increase in the total internet owners is least to that over the earlier period?

(a) 2009-2010 (b) 20102011 (c) 2011-2012 (d) 2013-2014

12. What is the total number of fresh internet owners in the period 2013-14?

(a) 54900	(b) 549000	(c) 9900000	(d) 99000
		(CONTRACT)	

13.What is (be proportion of Government internetowners to the Private Internet owners in the period 2011-12?

(a) 13:4 (b) 13:3 (c) 3:13 (d) 4:13

14.What is the approximate percentage increase in the Private internet owners in the period 2013-14 over that in the period 2010-11?(a) 5000 (b) 6000 (c) 8000 (d) 4000

15.What is the approximate percentage of Private interne towners in the total internet owners in 2010-117

(a) 20 (b) 5 (c) 10 (d) 15

**DIRECTIONS(Qs.16-20):**Study the following table to answer the given questions:

Company	Years					Total	
Ta	2009	2010	2011	2012	2013	2014	
P	103	150	105	107	110	132	707
ZIR	75	80	83	86	90	91	505
AVC	300	300	300	360	370	340	1970
CTU	275	280	281	280	285	287	1688
PEN	25	30	35	40	42	45	217
vSIO	85	87	89	91	92	96	540
Total	863	927	893	964	989	991	5627

Production (in crore units) of six companies over theyear

16.The production of Company AVC in 2012 is approximately what per cent of its average production over the given years?

(a) 300 (b) 110 (c) 136 (d) 18.25

17.For SIO, which year was the per cent increase of decrease in production from the previous year, the highest?

(a) 2013 (b) 2010 (c) 2014 (d) 2012

18 Which company has less average production in the last three years compared to that of first three year?(a)No company(b) CTU(c) ZIR(d) None of these

19. The total production of the six companies in the first two given years is what per cent of that of last two given years? (round off up totwo decimal places)

(a) 87.08	(b) 10455
(c) 90.40	(d) 10.62

20.For ZIR, which of the following is the difference between production in 2014 and that in 2013?

(a) 10,00,00,000	(b) 1,00,00,000
(c) 10,00,000	(d) 40,00,000

### **Hints & Explanations**

1. (c) Total marks obtained by Meera = 100=80+50+90=60=470

2. (a) Average mark obtained by seven students in history

7

 $= \underline{80+70+70+60+90+60+80} = 72-86$ 

3. (a) Only Kunal and soni got 60% or more marks in all the subjects.

4. (c) Average percentage of kunal  $=\frac{90+70+60+90+70+70}{75\%}$  75%

5. (d) Average percentage growth of assemble  $PCs = \frac{20+25+25+50+55}{175} = \frac{175}{35\%}$ 

10

5

6. (d) Number of branded PCs sold in  $2014=10000x^{30} = 300000$ 

7. (d) Difference between Assembled andbranded PCs 2010 2011 2012 2013 2014 15% 10% 5% 20% 25% 8. (c) percent growth of Assembled PCs is 1997 1998 1999 No Change 25% 💿 5% 9. (d) percentage increase in the total internetowners 2008-09 2009-10 2010-11 2011-12 2012-13 2013-14 653.85 206.12 168.89 135.94 65.56 164.46 10. (c) reqd numbers =(1550000+950000)-(1060000+450000)=990000

11.(b) reqd ratio = 520000:120000=13:3

12. (c) reqd percentage increase =  $950000 - 12000 \times 100 \approx 8000\%$ 

12000

13.(b) Read percentage 12000  $100 \approx 5\%$ 230000 +12000 14.(b)Production of company AVC in 2012=360 crore units Average production of

AVC over the given years =  $\underline{1970}$ 

6

Hence required percent =  $\underline{360x6}$  x100 1970

=109.64%=110%

15. (c) Approximate percent increase of decrease in production from the previous year for SIO are as follows:

$$2010 = 2 \times 100 = 2.35\%$$

$$85$$

$$2011 = 2 \times 100 = 2.29\%$$

$$87$$

$$2012 = 2 \times 100 = 2.24\%$$

$$89$$

$$2013 = 1 \times 100 = 4.35\%$$

$$91$$

$$2014 = 4 \times 100 = 4.35\%$$

$$92$$

You can solve it simple rough work. See the difference of produced units between two consecutive years. The difference is maximum for 2013 to 2014, and production during all these years is almost same. Hence, in the year 2014 SIO registered maximum increase in production over the previous years.

16. d) Sum of the productions of the companies in first three years and the last three years in crore is as follows

	First three	Last three
Company	years	years
TP	358	349
ZIR	238	267
AVC	900	1070
CTU	836	852
PEN	90	127
SIO	261	279

17.(c) Total production of the companies in first two given years =863+927=1790 Again, total production of the six companies in last two given years years = 989+991=1980

Therefore required percent =  $\frac{1790 \times 100}{1980}$  =90.40%

18.(b)The required difference

19.= (91-90) crore units =  $1 \times 10000000 = 10000000$  units

20. (c) Those companies are:ZIR PEN and SIO

# Puzzles and Dice

Dice is a cube having different numbers on all its faces. The number are usually a single digit from 1 to 6.

### Numbers on a dice :-

The scheme of numbering on a dice is specific the sum of the number on the opposite faces will be equal to '7' always. The number 1 will be opposite to number 6. The number 2 is opposite to 5 and 3 is opposite to 4. Such that

1 + 6 = 7

2 + 5 = 7

4 + 3 = 7

#### **Classification of dice :-**

Standard dice: - when the dice are rolled, if the number on the faces of the dice do not match each other, they are called as standard dice.

Ordinary dice: - If one or more than one number matches between two dice then it is called as an ordinary dice.

#### Rule 1:-

If one of the numbers is common in both the dice when two dice have the same surface then the remaining surfaces of both dice are opposite to each other.



#### **Rule 2:-**

If any two numbers are the same in two dices irrespective of their position on the dice then the remaining third number in both the dice are opposite to each other.



#### **Rule 3:-**

If there is one element common on both the dice at the different position, then rotate the dice in a clockwise direction to get the opposite surface.



2. What number should replace the question mark:-



Solution :

The line moves 45 degree at each stage and alternate stage and alternates straight / curved. The dot moves on the line/ middle/ bottom & back again.
4. What number should replace the question mark ?



6. Which number comes opposite to 2 ?









a) 3 b) 6 Ans :- d) 5 c) 4

d) 5

Solution :-



Opposite of 2 is 5.

7. What digit will appear on the face opposite to the face with number 4?



8. Which number is on the face opposite to 6?



Ans : b) 1

Solution :-

6 → 1, <del>2</del>, <del>3, 4, 5</del>,

As the numbers 2, 3, 4 and 5 are adjacent to 6. Hence the number on the face opposite

9. From the four positions of a dice. given below, find the color which is opposite to yellow?



a) Violet b) Red c) Rose d) Blue

Ans :-a) Violet

Solution:-

The Colours adjacent to yellow are orange, blue, red and rose. Hence violet will be opposite to yellow.

10. From the positions of a cube are shown below which letter will be on the face opposite to face with 'A'?

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letter of the face opposite to the face with letter C.

LID LOGU

6

# 2 - Dimensional Shapes Formulae Square $= a^2$ sq units Area D Perimeter = 4a sq units $= a\sqrt{2}$ units Diagonal a Rectangle Area = Ixb sq units Length Perimeter = 2(1 + b) units Diagonal = $\sqrt{l^2 + b^2}$ units b breadth 1 Area of a rectangle = length × breadth Circle $= \pi r^2$ sq units Area circumference = $2 \pi r^2$ sq units Area of circle r $A = \pi r^2$ Semi-Circle = $1/2 \pi r^2$ sq units Area ំព circumference = $r(\pi + 2)$ sq units Area = $\frac{1}{2}\pi r^2$ Area = $1/4 \pi r^2$ sq units Quadrant Circle circumference = $(\frac{\pi}{2} + 2)r$ sq units r

## **Areas and Volumes Formulae**









### **Areas and Volumes**

#### I. SQUARE

1. Find the side of a square shaped postal stamp of perimeter 10 cm

b) 2 cm c) 2.5 cm a) 2.8 cm d) 2.4 cm Answer: c) 2.5 cm Solution:-Perimeter of the square  $= 4 \times S$  Units Given, Perimeter of square = 10 cm $4 \ge S = 10$ S = 10/4S = 2.5 cmThe side of the stamp is 2.5 cm 2. The side of a square is 8 cm. Find its perimeter a) 30 cm b) 32 cm c) 28 cm d) 24 cm Answer: b) 32 cm Solution:-Perimeter of the square  $= 4 \times S$  Units Given, the side of a square = 8 cm $= 4 \times 8$ S = 32 cmPerimeter of a square is 32 cm. 3. Find the cost of fencing a square plot of side 14 m at the rate of  $\gtrless$ 20 per metre. c) ₹1114 b) ₹1080 a) ₹1020 d) ₹1120 d) ₹1120 Answer:

#### Solution:-

Perimeter of a square plot =  $4 \times S$  Units Given, the side of a square plot (s) = 14 m=  $4 \times 14$ S = 56 m

Cost of fencing the plot at the rate of  $\gtrless 20$  per metre =  $56 \times 20$ 

= ₹1120

```
4. Find the perimeter and area of the square whose side is 11 cm.
a) 44 cm, 121 \text{ cm}^2
                                                 b) 22 cm, 121 \text{ cm}^2
c) 44 cm, 111 \text{ cm}^2
                                                 d) 22 cm, 111 cm<sup>2</sup>
                a) 44 cm, 121 cm<sup>2</sup>
Answer:
Solution:-
           Given, the side of a square (s)
                                                 = 11 \text{ cm}
           Perimeter of the square
                                                      =
                                                           4 x S Units
        = 4 \times 11
                          44 cm
                    =
                                                  (s)^2 sq. units
                Area of a square
                                             =
                                             = (11)<sup>2</sup>
                                                 121 cm<sup>2</sup>
                                              Ŧ
5. A square park has 40 m as its perimeter. what is the length of its side? Also find its diagonal?
        8 m, 8\sqrt{2}m
                                                 b) 20 \text{ m}, 20\sqrt{2}m
a)
                                                 d) 4 m, 4\sqrt{2}m
c) 10 m, 10\sqrt{2}m
                        c) 10 m, 10\sqrt{2}m
Answer:
Solution:-
           Given, the perimeter of a square (s)
                                                             40m
          4 x S
                             40
                     40
        S
                =
                              Side of a Square = 10 \text{ m}
          Also, Diagonal of a square = S\sqrt{2} units
                                                        ରୋର୍ଡ୍ଡ
                            LI DLOGU
                                                      10√2 m
```

# Reasoning

1. In e	ach of the follo	wing questions, select	the related word/numb	er from the given
alterna	tive			
i)	Flow: River: :	Stagnant :		
a)	Rain	b) Stream	c) Pool	d) Canal
Answe	er: c) Poo	1		
ii)	Ornithologist:	Bird: : Archaeologist:	:	-
a)	Islands	b) Mediators	c) Archaeology	d) Aquatic
Answe	er: c) Arc	haeology		
Soluti	on:-			
	As ornithol	logist is a specialist of	Birds. Similarly, Archa	neologist is a specialist of
Archae	eology.	10	TGN	
iii) Pea	acock: India: : ]	Bear:		
a)	Australia	b) America	c) Russia	d) England
Answe	er: c) Rus	sia	1220	
Soluti	on:-	9E 🔒		J
	As Peacock is	the national bird of In	dia. Similarly, Bear is t	the national animal of
Russia	- H	a E 🦊		
iv) Wi	ne: Cellar: : W	eapons:		197
a)	Godown	b) Arsenal	c) Armoury	d) Dungeon
Answe	er: b) Ars	senal		
Soluti	on:-			:0
	Cellar	is the storage space w	here wines are stored. S	Similarly, Arsenal is the
storage	e space where w	weapons are stored.		0
v) Che	f: Restaurant: :	Druggist:	<u>ш 6°</u>	
a)	Medicine	b) Pharmacy	c) Store	d) Chemist
Answe	er: b) Pha	armacy		
Soluti	on:-			
	A Chef works	in a restaurant. Simila	arly, a druggist works in	n a pharmacy.
vi) Ch	opper: Meat: : ;	Spanner:		
a)	Vegetables	b) Cakes	c) Nuts	d) Flash
Answe	er: c) Nut	S		
Soluti	on:-			

Chopper is used for cutting meat and spanner is used for turning nuts.

vii) Liquor: Drink: :	:
a) Bread: Butter	b) Tea: Beverage
c) Snuff: Inhale	d) Water: Sip
Answer: c) Nuts	
Solution:-	
Chopper is used for c	utting meat and spanner is used for turning nuts.
Vii) Liquor : Drink : :	:
a) Bread : Butter	b)Tea : Beverage
c) Snuff : Inhale	d) Water : Sip
Answer :- b) Tea : Beverag	ge
Liquid is an alcoholic drink	
Tea is an aromatic beverage	
Viii) Symphony : Music : :	
a) Mural : Painting	b) Ode : Prose
c) Preface : Book	d) Editorial : Journal
Answer : a) Mural : Painti	ng a ta a ta a
Solution:-	
Symphony is a type of music	, Simila <mark>rly mural is a type of</mark> painting.
ix) Newspaper : Hoarding :	Television :
a) Press	b) Media
c) Broadcast d) Rur	nour
Answer: b) Media	$\odot$ $M$ $\odot$
x) Man: Biography : : Nation	
a) Leader	b) People
c) Geography	d) History
Answer: History	
Solution:-	
As Biography Contains the s	tory of the man similarly, History contains the story of the natic.
2. If Humble is given by the	code EHLUBM.
What does the code EDUCA	TION mean?
a) NEDOIUTCA	b) NEOIDUTCA
c) NEDUOITCA	d) NEODIUTCA
Solution:-	
H U M	B L E
<b>↓ ↓</b>	

Е

Η

U

В

М

Similarly,



3. If in a certain language, MADRAS is coded as NBESBT, how is BOMBAY coded in that language ?

a) CPNCBX	b) CPNCBZ
c) CPOCBZ	d) CQOCBZ

#### Answer : b) CPNCBZ

Solution :

	М	А	D	R	А	S	0
	+1	+1	+1	+1	<b>9</b> 1	+1	GI
	Ν	В	Е	S	В	Т	
Similar	ly			Ŭ,			
	В	0	М	В	A	Y	
	+1	+1	+1	+1	+1	+1	
	С	Р	Ν	С	В	Z	

4. In a certain code language, OPERATION is written as NODQBUJPO. How is INVISIBLE written in that code?

a) JOWJTJCMF				b) JC	) WJTHA				
c) HMUHTJCMF				(d) H	MUHTH	IAXD	)		
Answer : c) HMUHTJCMF					2003	<b>4)</b>		N.S.	
Solution	n :-		1	11.					9) )
	0	Р	E	R	Α	Т	6	0	Ν
	-1	-1	-1	-1	+1	• 41	+1	+1	+1
	Ν	0	D	Q	В	U	J	Р	0
Similarl	y,								
	Ι	Ν	V	Ι	S	Ι	В	L	Е
	-1	-1	-1	-1	+1	+1	+1	+1	+1
	Η	Μ	U	Н	Т	J	С	Μ	F
5. In a certain code, FAVOUR				is wr	ritten as I	EBUPI	S. Hov	v is DANGER written in that	
code?									
a) CBFFDS				b) C	b) CBMHDS				
c) EBFF	HDS				d) El	BHHFS			

Answer : b) CBMHDS

### Solution :-

	F	А	V	0	U	R
	-1	+1	-1	+1	-1	+1
	Е	В	U	Р	Т	S
Simila	rly,					
	D	А	Ν	G	Е	R
	-1	+1	-1	+1	-1	+1
	С	В	М	Н	D	S

6. In a certain code, Institution is written as NOITUTITSNI. How is PERFECTION written in that code?

a) NOTECFREP			b) N	OITCE	FREP						
c) NIOCTEFREP			d) N	OITCE	FERP	6					
Answer : b) NOITCEF			EFREP	<b>b</b>		Gi					
Solution :-		· /·						101			
Ι	Ν	S	Т	I	Т	U	Т	T	0	Ν	
<b>▲</b> N	0	E	Т	U	Т	I	Т	S	N	<u>    I</u>	
Similarly,		$\square$	2						1		
	Р	Е	R	F	E	С	Т	Ι	0	Ν	
	Ν	0	-I	Т	C	Е	F	R	Е	Р	
			E	12.00		87 -	1	<b>7</b> -77			
7. In a certain	n code	, PROD	UCED i	is writte	en as DO	ORPDE	CU. Ho	ow is G	OODNE	ESS writt	en in
that code?		- N		•	141.15		)	IV			
a) DOOSGS	EN	્ર			b) D	OOGSE	ESN	V.S	>		
c) DOOGSS	EN	1	U.		d) D	OGOSS	SEN	S			
Answer: c) DOOGSSEN			SEN		a	06	270	, .			
Solution :-				-0(	لياه	61					
Р	R	0	D		U	С	Е	D			
	L					$\square$					
	Q	∕ <b>_</b> R	Р		D	E	<b>∖</b> C	U			
Similarly											
G	0	0	D		Ν	E	S	S			
				/	$ \rightarrow $	$\square$					
	<b>V</b> O	<b>∽</b> 0	G		-S	S	<b>→</b> E	Ν			
8. In a certai	in cod	e, SILEI	NT is wi	ritten as	STINC	E. How	is RE	ΓURN v	vritten i	n that co	de?
a) RNRETU				b) R	NETRU	l					
c) RNERTU		d) RENRTU									



9. In a certain code, BOXER is written as AQWGQ. How VISIT is written in that code?

