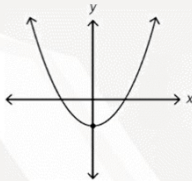


1. A number is 10 more than its triple. Find the number?
2. A said to B, "I was 5 years older than you are now, when you were born. Today I am one and a half times of then." Find the present age of B?
3. A, B & C have total ₹240 with them. A gave some amount to each of B & C such that he doubles their amount and now left with ₹40. Find the initial amount with A?
4. Free notebooks were distributed equally among children of a class. The number of notebooks each child got was one-eighth of the number of children. Had the number of children been half, each child would have got 16 notebooks. Total how many notebooks were there?
5. Tom is four times as old as Jerry. In x years Tom will be three times as old as Jerry. How old is Jerry, in terms of x ?
(A) $2x$ (B) $3x$ (C) $4x$ (D) $8x$ (E) $12x$
6. There are 2 boxes containing certain number of packets. If 10 packets were moved from 1st to 2nd box then there will be same number of packets in both boxes. If 20 packets are moved from 2nd to 1st box then 1st box will have double the number of packets as the 2nd box. Determine the number of packets in the 1st box?
(A) 40 (B) 60 (C) 80 (D) 100 (E) 120
7. Betaal is able to purchase x chocolates in ₹120. When price of chocolate increases by ₹1 then he is able to purchase 10 chocolates less than earlier in ₹120. Find x ?
8. Solve the equations for (x,y)
(i) $3x+4y = 11$ & $4.5x+6y = 17$
(ii) $\frac{3}{x} + \frac{5}{y} = 1$ & $\frac{2}{x} + \frac{3}{y} = 5$
9. If roots of the equation $x^2-kx-20=0$, are α and β such that $\alpha > \beta$ then

Quantity A α	Quantity B 0
------------------------	-----------------
10. Find the roots of the given quadratic equations
(i) $a^2-4a=0$
(ii) $2m^2+30m+108=0$
(iii) $4c^2-12c+3=0$
11. Find the quadratic equation if
(i) Roots are 7 & -2
(ii) Sum and product of the roots are 12 & -20 respectively
(iii) If $(2x + 3)$ & $(x-5)$ are factors of quadratic function?
12. $F(x) = -x^2+3x-25$

Quantity A Maximum value of $F(x)$	Quantity B 0
---------------------------------------	-----------------
13. For what value of k , $3x+8y = 50$ and $9x+24y = k$ equations are
(i) Consistent (ii) Inconsistent
14. If roots of the equation, $3m^2-4m+n=0$, are reciprocals of each other then find n ?
15. If the parabola described the equation $y = f(x) = x^2+bx+c$, cuts the x -axis at -4 and y -axis at 4. Find the 2nd point at which parabola cuts the x -axis?
(A) -1 (B) 4 (C) 1 (D) -4 (E) 0
16. $x^2-kx+12 = 0$, has real roots then which of the following could be the value of k ? (Mark all the correct answers)
(A) 12 (B) -12 (C) 6.5 (D) 4
(E) -7.5 (F) 7 (G) 0 (H) -6
17. X birds are seated on certain number of branches of a tree. If 16 birds are to be seated on each branch then 8 are left to be seated but if 20 birds are to be seated on each branch, 2 branches are left empty. Find X ?
18. $x^2+2x+7 = 0$ and $ax^2+bx+c = 0$ has one root in common then find $a:b:c$ if a , b & c are real numbers?
19. $y = f(x) = ax^2+bx+c$, $(x-2)$ is a factor of $f(x)$ and $f(-5) = 0$ For what value of x , $f(x)$ is minimum?
20. Cost of 3 mangoes, 5 apples & 8 oranges is 50 and 7 apples, 9 mangoes & 4 oranges is 82. Find the cost of an orange, an apple and a mango?
21. Sum of a 2 digit number N and its reverse is a square.

Quantity A Number of values N can take	Quantity B 6
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22. Which of the following could be the equation of the figure above?



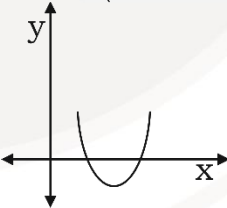
(A) $y = x - 2$

(B) $y = x^2 - x$

(C) $y = x^2 - 2$

(D) $y^2 = x^2$

(E) $y = x^3 - 2$
23. Which of the following could be true about the given parabola? (Mark all the correct answers)?



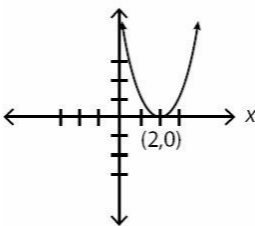
(A) Sum of the roots is +ve

(B) Equation has Unique roots.

(C) $D < 0$

(D) Y co-ordinate of vertex of parabola is negative.

(E) $a > 0$
24. If the equation of the parabola pictured above is $y = (x-h)^2 + k$ and $(-3, n)$ is a point on the parabola, what is the value of n ?


25. Find the number of solutions for the (x,y) if x & y are natural numbers? $4x+5y = 114$

1. Find the average of following numbers
 - (i) 7, 10, 23, 35, 40
 - (ii) 14, 21, 28, 35,343
 - (iii) 2, 6, 8, 12, 30
 - (iv) 1, 2, 3, 4, 96, 97, 98, 99
 - (v) 1,2,3,4,.....27
 - (vi) 90, 92, 89, 96, 95, 92
2. Average height of 80 boys is 104 cm. 2 boys with height 98cm and 110cm leaves the group then, find the new average?
3. Present average age of a group of boys is 12 years. Find the average age of the group after 7 years?
4. In a class average age of 10 boys is 13 years and average age of 30 girls is 13 years then, find the average age of the class?
5. Average height of a group of 12 is 82 cm. When two men with height 72 cm and 94 cm are replaced by men with height 106 cm and 48 cm then, find increase in the average height?
6. Average of first 4 numbers out of 5 numbers is 62 and average of last 4 numbers is 67. If ratio of first and last numbers is 7:9 then find last number?
7. Average amount with 10 children is Rs25. A child joins the group with Rs65. Find the new average?
8. Average amount with x boys is Rs36. When a boy with Rs72 joins the group then, average amount increases by Rs2. Find x?
9. Average age of a group of 25 members is 24 years. When a person left the group average age becomes 22 years. Find the age of that member?
10. Average marks of 20 students is 74 but later they came to know that 88 & 76 are wrongly taken as 75 & 59. Find the actual average marks?
11. Average of 1st 3 numbers out of 7 numbers is 12 and average of last 3 numbers is 10. Then find 4th number if average of 7 numbers is 13?
12.

(i) $x > 4$	Quantity B
Quantity A	4
Average(x,4)	
(ii) Quantity A	Quantity B
Average	Average
(10, 20, 40, x)	(11, 19, x, 40)
(iii) Quantity A	Quantity A
Average	Average
(20, 30, 30, 30)	(20, 30, 30, 30, 20)
(iv) Quantity A	Quantity A
$10 \times \text{Average}$	Average
(12, 15, 25, 80)	(120, 150, 250, 800)
13. 40Kg rice costing 24/kg is mixed with 120Kg rice costing 16/kg then find the selling price of the mixture if profit is 15%?
14. In a class average height of x boys is 80cm & average height of y girls is 64cm and average height of entire class is not more than 72cm then which of the following can be the values for (x,y)? (Mark all the correct answers)

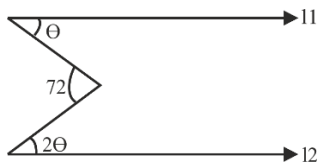
(A)(500,500)	(B)(25,51)
(C)(51,25)	(D)(1,100)
	(E)(72,70)
15. Average of 25 consecutive natural numbers is 25. Find the smallest number?
16. Find average of all the multiples of 7 between 100 & 350?
17. In a class average weight of 35 boys is x kg and that 54 girls is y kg and average weight of entire class is z kg then

Quantity A	Quantity B
x-z	y-z
18. 15lit of 10% spirit solution is mixed with x lit of 6% spirit solution. If the resulting solution has 9% concentration, then find x?
19. 87% milk solution is mixed with x% milk solution in order to get 79% milk solution then find x if quantities of solutions are 5lit and 8lit respectively?
20. A container contains 40lit of milk. From this container 4 lit of milk was taken out and replaced by water. This process was repeated further 2 times. How many litre of milk is now contained by the container?
21. A milk vendor has 2 cans of milk. The first contains 25% water and the rest milk. The second contains 50% water. How much milk solution should he mix from each of the containers so as to get 12 lit solution such that the ratio of water to milk is 3:5? (Mark all the correct options)

(A) 4 lit	(B) 5 lit	(C) 6lit
(D) 8lit	(E) 7lit	
22. Average of 5 distinct natural numbers is 28 then find the value of maximum natural number out of five given numbers?
23. Ten years ago average age of a couple was 27 years. Today the present average age of the couple and their child is 27 years. Find the present age of the child?
24. A salesman sold 2 pens : first at 5% profit and second at 2% loss and his overall profit is 4% profit then find the ratio of CP of both the articles.
25. In the next match if Kohli scores 100 runs in the match his average score will be 62.85 but if he scores 50 runs in the match his average score will be 62.35. How many matches has he played?

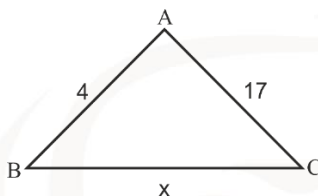
Lines and Triangle

1. Find θ if lines l_1 and l_2 are parallel?



2. A Regular Polygon has 8 sides then find the measurement of each internal angle and each external angle of a polygon?

3.

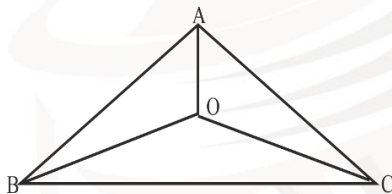


Quantity A
No. of values that x can take

Quantity B
20

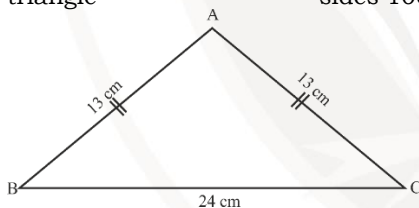
4. If 2 sides of a triangle are 10cm and 26cm then find the range of the perimeter of the triangle?

5. In $\triangle ABC$ $AO = BO = CO = 5$ If $\triangle ABC$ is equilateral then find the Area of $\triangle ABC$.



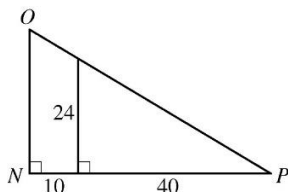
6. Quantity A
Area of the given triangle

Quantity B
Area of triangle with 2 sides 10cm & 15cm



7. In a $\triangle ABC$, AD is angle bisector of $\angle BAC$ and $AB = 12$ cm, $AC = 20$ cm then find BC if BD is 6cm?

8.

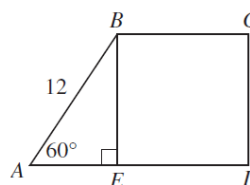


Find ON?

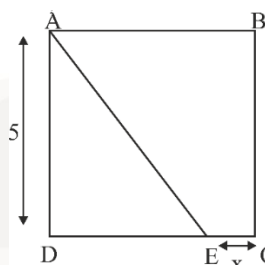
9. In $\triangle ABC$, find median BD if $AB = 3.6$ cm, $BC = 4.8$ cm and $\angle B = 90^\circ$?

10. In a $\triangle ABC$, $DE \parallel BC$ and $AD:DB = 2:5$. Find the ratio of area of $\triangle ADE$ to area of $\triangle ABC$?

11. In the figure below, BCDE is a square and $AB = 12$. What is the area of square BCDE?



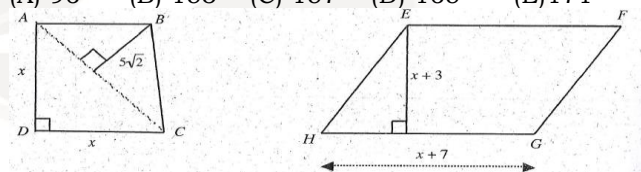
12. Find the ratio of area of $\triangle ADE$ to area of square ABCD?



Quadrilateral & Mensuration

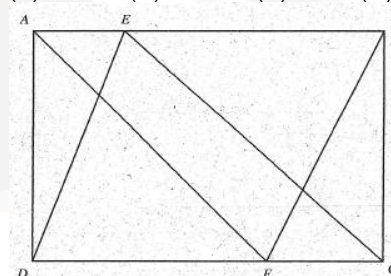
13. Find the area of cyclic quadrilateral with sides 12cm, 20cm, 18cm and 10cm?

14. In the figure, the area of quadrilateral ABCD is 75. What is the area of parallelogram EFGH?
(A) 96 (B) 153 (C) 157 (D) 165 (E) 171



15. In the figure the areas of parallelograms EBFD and AECF are 3 and 2 respectively. What is the area of rectangle ABCD?

(A) 3 (B) 4 (C) 5 (D) $4\sqrt{3}$ (E) 7



16. Area of an isosceles trapezium is 176 cm^2 and its parallel sides are 26cm and 18cm. Find the oblique side of the trapezium?

17. 3 Cubes each of side 5cm are joined together to form a L shape. Find its surface area?

18. The volume of a wall, 5 times as high as it is broad and 8 times as long as it is high, is 12.8 cu. meters. Find the breadth of the wall.

(A) 0.04m (B) 4m (C) 400 cm (D) 40 cm

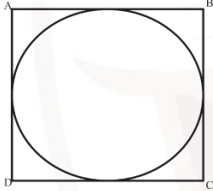
19. From a Solid Right Circular Cylinder of Height 2.4 Cm and Radius 0.7 Cm, a Right Circular Cone of Same Height and Same Radius is Cut Out. Find the surface area of the remaining solid?
20. A right circular cylinder with radius 6cm and height 14 cm is cut into 2 equal parts

If cut parallel to its base then change in the surface area	If cut is perpendicular to its base then change in the surface area
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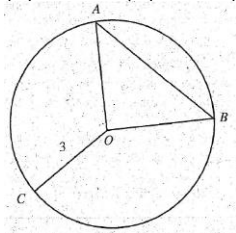
21. A conical vessel, whose internal radius is 12 cm and height 50 cm, is full of some liquid. The contents of this vessel are emptied into a cylindrical vessel with an internal radius of 10 cm. Find the height to which the liquid rises in the cylindrical vessel.
(A) 22 cm (B) 23 cm (C) 24 cm (D) 25 cm
22. If diagonals of a Rhombus are 24cm and 32cm then find the perimeter of the Rhombus?
23. Find the length of the longest rod that can be kept inside the cylinder formed by folding a square of side 10cm?
24. A cube of side 7cm is painted blue and then cut into small identical cubes each of side 1 cm. How many small cubes have exactly 1 face painted?

Circle

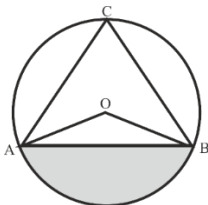
25. AB = 20cm, CD = 15cm, BC = 17cm then find AD, if a circle is inscribed in a Quadrilateral ABCD.



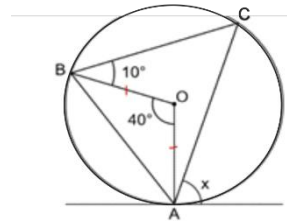
26. A regular hexagon with longest diagonal 8 cm is inscribed in a circle. Find the area of circle?
27. Find the maximum area of a quadrilateral which is inscribed in a circle of radius 8cm?
28. Find the length of chord which is 7cm from the center of the circle with radius 25cm
29. In the circle shown in the figure the length of the arc ACB is 3 times the length of the arc AB. What is the length of the line segment AB?
(A) 3 (B) 4 (C) 5 (D) $2\sqrt{3}$ (E) $3\sqrt{2}$



30. In $\triangle ABC$ $\angle ACB = 15^\circ$ then find the area of shaded region if radius of the circle is 42cm.

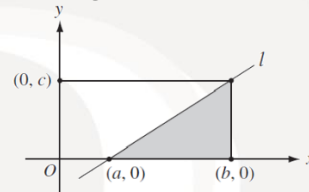


31. Find x°

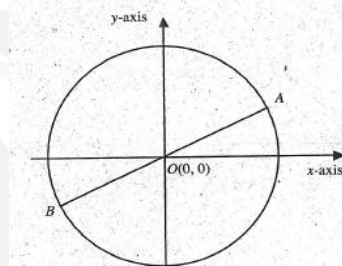


Co-ordinate Geometry

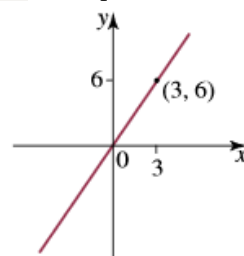
32. If line L_1 with equation $2x+3y=10$, intersect perpendicular line L_2 at the point (5,6) then find the equation of L_2 ?
33. Find the slope, x-intercept and y-intercept of a line $x+3y = 63$
34. Lines l_1 and l_2 are parallel and equation of l_1 is $2x+9y=30$, then find the equation of l_2 if it passes through the point (2,7)?
35. In the figure, Find the area of shaded triangle.



36. In the figure shown AB is a diameter of the circle and O is the center of the circle. If A = (3, 4), then what is the circumference of the circle?
(A) 3 (B) 4 (C) 4π (D) 5π (E) 10π



37. Find the equation of the given line?



38. Find the radius and center of the circle if equation of circle is $2x^2+2y^2+16x-20y-46 = 0$?
39. Point P (5,5) divides line segment AB in what ratio if A(7,7) and B(9,9)?
40. Find distance between 2 parallel lines with equations $4x+9y = 20$, $8x+18y = 34$

Numbers 1 Class Sheet

1. Quantity A
 $0.\overline{12}$
- Quantity B
 $0.\overline{121}$
2. In an organization total number of employees is a 3 digit prime number then which of the following could be the ratio of graduate and under-graduate employees?
(A) 100:89 (B) 100:121
(C) 100:223 (D) 100:99
3. If $4N$ is divisible by 32 but not by 64 then which of the following could be divisible by 48? (Mark all the correct answers)
(A) $6N$ (B) $20N$
(C) $100N$ (D) $3N$ (E) $7N$
4. Find the remainder
(I) $\frac{121 \times 122}{60}$ (II) $\frac{118 \times 117 \times 131}{60}$
(III) $\frac{121 \times 118 \times 124}{60}$ (IV) $\frac{82^{75}}{27}$
(V) $\frac{84^{55}}{17}$ (VI) $\frac{31^{123} + 33^{86}}{16}$
(VII) $\frac{35^{62}}{11}$ (VIII) $\frac{4^{56}}{15}$
5. If x is a positive even integer and y is a positive odd integer, which of the following statements CANNOT be true? (Indicate all such statements)
(A) $x + y$ is divisible by 3
(B) $3x + 2y$ is divisible by 4
(C) $2x + 3y$ is divisible by 6
6. When N is divisible by 12 remainder is 3. Then which of the following are definitely divisible by 3? (Mark all the correct answers)
(A) $5N + 726$ (B) $13N + 79$
(C) $22N + 891$ (D) $20N^2 + 561$
7. Find the remainder when $(N+M)$ is divided by 10 if N is divisible by 8 and $N = 2358993a$ & $M = 6930$
8. If $(180! + 1) < P < (180! + 180)$, P is natural number. How many prime values P can take?
(A) 4 (B) 7
(C) more than 20 (D) None
9. If n is an odd integer, which of the following must be an even integer?
(A) $\frac{n}{2}$ (B) $5n + 3$
(C) $3n$ (D) $\frac{n}{4}$ (E) \sqrt{n}
10. Find the highest power of 7 in $178!$?
11. If $\frac{57!}{10^x} = \text{Integer}$, then find maximum value of x ?
12. If x and y are perfect squares, then which of the following is not necessarily a perfect square?
(A) x^2 (B) xy
(C) $4x$ (D) $x + y$ (E) x^5
13. If the integer x is divisible by 3 but not by 2, then which one of the following expressions is NEVER an integer?
(A) $\frac{(x+1)}{2}$ (B) $\frac{x}{7}$
(C) $\frac{x^2}{3}$ (D) $\frac{x^3}{3}$ (E) $\frac{x}{24}$
14. When a natural number N is divided by 40 remainder is 26 then
Quantity A
Remainder when N is divided by 7
Quantity B
4
15. Find the minimum natural number which should be multiplied to 120 so that it becomes perfect cube?
16. For any natural numbers a, b , & c : $(a+b)(b+c)(c+a)$ is
(A) Always even
(B) Always odd
(C) Depends on numbers
17. Smallest $n!$ Such that it is divisible by 242?
18. N is the smallest perfect square which is divisible by 6, 8 & 15. Find N ?
19. From all-natural numbers from 2 to 2500, first all the perfect squares are erased, then all the perfect cubes are erased, then all the perfect 4th powers and so on, in successive rounds. How many rounds are there such that at least one number is erased in the round.
20. How many multiples of 9 are between 100 & 450?
21. Quantity A
 2^{100}
- Quantity B
 3^{60}
22. The remainder when the positive integer m is divided by n is r . What is the remainder when $2m$ is divided by $2n$?
(A) r (B) $2r$
(C) $2n$ (D) $m - nr$ (E) $2(m - nr)$
23. What is the value of $3!(7 - 2)!$?
24. If $2^{5^3} = 4^x$, then find x ?
25. When 1000 is added to 459×251 and the resulting number is divided by 11, the remainder is 8. Find x .
(A) 3 (B) 5
(C) 7 (D) 8 (E) 9



1. Find the last digit/unit digit of
 - (i) $245^{86} \times 3696^{239}$
 - (ii) $2687^{238} + 23^{264}$
 - (iii) $81a52^{68a48}$
 - (iv) Product of first 10 prime numbers
 - (v) Find the unit digit of $(0!+1!+2!+\dots+368!)$
2. Find the last 2 digits of
 - (i) 4586^2
 - (ii) 12458×3652
3. Find the number of factors, total prime factors and distinct prime factors of
 - (i) 168
 - (ii) $N = p^3q^6$, where p and q are prime numbers
4. How many factors of N are multiple of 10 if $N = 20 \times 3^4 \times 125$?
5. Find the term in
 - (i) 7, 13, 19,, t_{20}
 - (ii) 125, $25\sqrt{5}$, 25, $5\sqrt{5}$, ..., t_{17}
6. If sum of first 3 terms of an AP is equal to sum of first 4 terms then find sum of first 7 terms?
7. If the sum of the first n terms of an arithmetic progression is 2400 and the sum of next n terms is 7200, then find the ratio of first term and common difference.
 - (A) 3 : 2
 - (B) 2 : 1
 - (C) 1 : 2
 - (D) 2 : 3
8. Find the average of all two-digit numbers that give a remainder 4 when they are divided by 5?
9. If $a+b = 25$, then find maximum value of $(a \times b)$
 - (i) $a, b > 0$
 - (ii) a & b are natural numbers
10. If 5th term of a GP is 10 then find the product of the first 9 terms and also find product of 2nd term and 8th terms?
11. Find the GCD & LCM of the following
 - (i) (12, 44)
 - (ii) (25, 9)
 - (iii) $\left(\frac{4}{7}, \frac{8}{21}\right)$
12. When 231 is divided by n remainder is 11 then which of the following could be the value of n? (Mark all the correct answer)
 - (A) 44 (B) 10 (C) 22
 - (D) 30 (E) 4 (F) 55
13. When 489 and 604 are divided by n remainders are 9 & 4 respectively then find maximum value of n?
14.
 - (i) Find the sum of first 13 odd natural numbers
 - (ii) $1+3+5+\dots+k = 441$
 - (iii) $2+4+6+\dots+22 =$
 - (iv) $2+4+6+\dots+k = 600$
15. Which of the following could be the average of 20 distinct natural numbers? (Mark all the correct answers)
 - (A) 12
 - (B) 13.6
 - (C) 7
 - (D) 43.82
 - (E) 89.35
 - (F) 81.37
16. If a, b & c are positive real numbers and $a+b+c = 21$

Quantity A	Quantity B
Maximum value of $(a+1) \times (b+2) \times (c+3)$	721
17. Find the largest 3 digit number which when divided by 6, 9, 10 & 15 will leave a remainder 2?
18. Find the number which when divided by 8 leaves remainder 6, when divided by 7 leaves remainder 5, when divided by 6 leaves remainder 4, when divided by 5 leaves remainder 3? (Mark all the correct answers)
 - (A) 118
 - (B) 418
 - (C) 838
 - (D) 1678
 - (E) 2008
19. Find the greatest number that will divide 43, 91 & 183 so as to leave the same remainder in each case?
20. HCF of 2 numbers is 14 and their sum is 210. How many such pairs are possible?
21. ABCD is a square with side 10cm. By joining the mid points of this square again a square is formed and this process is repeated till infinite. Find the sum of area of all the squares?
22. There are 2 Arithmetic progressions : 3, 7, 11,, 219 & 1, 7, 13,, 241. Find the number of common terms in both the AP?
23. $A = \{n, n+1, n+2, n+3, n+4, n+5\}$ for any natural number $n \leq 98$. For how many values of n A contains at least one multiple of 10?
24. $t_n = t_{(n-1)} - t_{(n-2)} + t_{(n-3)}$, for $n \geq 4$, then find the sum of first 102 terms of the given series? $t_1 = 1, t_2 = -2, t_3 = 3$
25. $A = \{7, 12, 17, 22, \dots, 182\}$. Maximum how many terms from A can be selected such that sum of any 2 terms is less than 189?

Percentage Class Sheet

1. What % is 1.25 of 10?
2. Alpha earns \$8000 and Beta earns 25% more than Alpha. Find salary of Beta?
3. Salary of Lisa, in the year 2020 is \$10000. Next year, it will increase by 200%. What will be her salary in 2021.
4. Price of an Iphone in a sale was \$200, which was 20% of your pocket money. What is your pocket Money?
5. In a Class, there were 200 students. In 3rd lecture, 48 students moved to conference hall. What % of students are still in the class?
6. Anant got 30% of the maximum marks and failed by 10 marks. If maximum marks are 150 then find passing marks?
7. In a class 40% are boys and remaining are girls. Among boys 20% passed the exam and among girls 40% passed the exam. What is the pass percentage of entire class?
8. Price of an Article is \$50 in January. In the month of February it becomes 1.2 times of itself. Find percentage Increase?
9. Stock value of Prakash is 0.92 times of Hiren then stock value of Prakash is what percent less than that of Hiren?
10. Salary of A becomes $\frac{9}{8}$ times of his previous salary. By how much percent his salary has been increased?
11. When someone increases salary of Hitesh by 83.33 % then it becomes 121k then find the original salary of Hitesh?
12. Donut company increases his production each month by 100 count. In the Month of January 2020, the production was 800k. In which month of the year 2020, percentage increase in production will be lowest?
13. 12% is what % less than 16%?
14. Akshay and Anand have their salary in the ratio of 5:8 then Anand's salary is what percent more than that of Akshay?
15. Amit has 12.5% share value less than Bhavesh, then Bhavesh's share value is what percent more than that of Amit?
16. If the price of petrol increases by 25%, then by how much percent a user cut down his consumption so that his expenditure on petrol remains constant?
17. From 1998 to 1999 the percentage increase in male population was 20% and from 1999 to 2000 it decreases by 10% and Male population of a city in year 2000 is 1.08 million. Then what was the male population of the city in 1998?
18. The rate of inflation in country is 100 % p.a.. Cost of an Article is 6\$ now then what will be the cost of the article two year from now? (Inflation means general increase in Price level)
19. If radius of a circle increases by 40% then what is the % change in the Circumference and area of the circle?
20. In a car showroom 20% of the cars are red, 25% of the remaining are blue and the rest are black. If there are 720 black car in the showroom then find the total number of cars in the showroom?
21. When a positive number x is multiplied by the same number then resulting number is what percent more than the original number.
(A) $(x-1) \%$ (B) $(x-1) * 100\%$ (C) $(x+1) \%$ (D) $(x+1) * 100\%$
22. If 400 is increased by 20%, and then reduced by $y\%$, yielding 432 then find y ?
23. In a cricket match India beat Australia by 2 runs. If Sachin scores 22.22% of the total score of India then which of the following can be the score of India ?(Mark all the correct answers)
(A) 306 (B) 308 (C) 317 (D) 328 (E) 351 (F) 389
24. Quantity A Quantity B
 $x\%$ of $y\%$ of z $y\%$ of $z\%$ of x
25. Quantity A Quantity B
19.9% of 85 17



Profit & Loss Class Sheet

1. (i) If CP is 240 and profit is 15% then find SP?
(ii) If SP is 535 and CP is 500 then find profit %?
(iii) If CP is 340 and loss is 5% then find SP?
(iv) If SP is 735 and loss is 2% then find CP?
2. When an article is sold at certain price then there is profit of 28%. When CP and SP both are increased by 42% then find new profit %?
3. (i) If markup is x% and discount is x%

Quantity A	Quantity B
CP	SP

(ii) If markup is x% and discount is y% & profit is z% (x,y,z are positive)

Quantity A	Quantity B
x	y
4. Salesman sold a pen in ₹750 at 16.66% loss then find SP if profit is 22.22% ?
5. CP of a pen is 320. Then find the increase in SP if profit % is changed from 8% to 13%.
6. If CP of 10 pens is equal to SP of 12 pens then find profit or loss %?
7. CP of 30 pens is equal to SP of x pens and loss is 9.09% then find x?
8. A salesman sold 44 articles and his profit is equal to SP of 8 articles then find profit%?
9. A man purchased 2 pens in ₹70 and ₹150 respectively. He sold first pen at 40% profit and second at 4% loss. Find his overall profit or loss %?
10. If profit is 14.28% then find margin %?
11. If margin is 60% then find profit %?
12. If CP is 110 and mark up is 36.36%. Find MP?
13. A shopkeeper increased the CP of a pen and marked the price as 160, then allowed a discount of 20%. Find SP of pen?
14. If MP is 270 and SP is 240 then find discount %?
15. If mark-up is 200% and discount is 40% then find profit %?
16. If mark-up is 70% and profit is 19% then find discount%?
17. If mark-up is 40% then find discount % if profit is 0%?
18. Two successive discounts of 20% and 35% are equivalent to a single discount of what %?
19. Salesman gives discount of 30% and still able to manage profit of 33% then find his mark-up %?
20. A milkman mixes 30% water in the pure milk and sells at CP then find his profit% and also find his profit % if he sells at 10% less than CP?
21. Betal sold an article to Birbal at 20% profit and Birbal sold same article to Chatur at 30% profit and Chatur sold same article to Tenali at 20% loss. If CP of Tenali is 1040 then find the CP of Birbal.
22. A salesman bought every 5 articles for ₹4 and sold them every 4 articles for ₹5. Then find his profit %?
23. A salesman sold 2 articles. On 1st article there is profit of 40% and on 2nd there is loss of 40% and SP of both articles is same. Find overall loss% ?
24. A showroom offers buy 3 get 2 free and marked price is same for all then find the discount %?
25. Ashok made a loss of 15% by selling 96 apples for ₹2040. How many apples must he sell for ₹2600 to make a 30% gain?
 (A) 80
 (B) 100
 (C) 65
 (D) 104

Ratio Class Sheet

1. The sum of three numbers is 98. If the ratio of the first to second is 2 : 3 and that of the second to the third is 5 : 8, then the second number is:
2. If ratio of 4 angles(A,B,C & D) of a quadrilateral is 2: 7: 8: 7 and $\angle A + \angle B + \angle C = 255$. Find $\angle B$?
3. If the numbers of Apple to Banana to Kiwi is in the ratio of 2 : 5 : 11 and the number of banana is 45 more than that of Apples, then how many Kiwis are there?
4. There are five more computers in the office than employees. If there are 10 employees in the office, what is the ratio of computers to employees in the office?
(A) 2 : 3
(B) 2 : 5
(C) 3 : 2
(D) 3 : 5
(E) 5 : 2
5. A team played 60 games, of which it won 40% games. 4 games were a tie. What part of the games played did the team lose?
(A) $\frac{8}{15}$
(B) $\frac{3}{10}$
(C) $\frac{3}{5}$
(D) $\frac{7}{3}$
6. Ratio of 2 numbers is 5:4. When both the numbers are increased by 10 then their ratio becomes 7:6. Find the numbers?
7. If numerator of a fraction is increased by 25% and Denominator is decreased by 10 %, then it becomes $\frac{5}{9}$ Find original Fraction?
8. The ratio of the number of boys and girls in a school is 5 : 4. If 18 new boys, which is 5 % of total students, joins the class. What fraction of girls is now in the school?
9. 5 years ago, ratio of ages of Andy, Cathy and Wayne is 2 : 3 : 5. If Sum of their present ages 75 years. Find present age of Andy.
10. 5 years ago, ratio of ages of Father and Son was 7 : 2. 4 years hence ratio of their ages will be 3 : 1. Find present age of Son?
11. A amount of Rs. 735 was divided between A, B and C. If each of them had received Rs. 25 less, their shares would be in the ratio of 1 : 3 : 2. Find the share of C.
(A) Rs. 170
(B) Rs. 195
(C) Rs. 220
(D) Rs. 245
(E) 270
12. The ratio of Dough to cream in a cake is 3:5. If the quantity of cream is increased by 60%, Find percentage of Dough in the cake?
13. 40 litres of Solution contains Water and Lime in the ratio of 4: 1. Find Values for following.
(A) If 6 litre Solution is removed, then ratio of Water and Lime Now
(B) If 10 litre Solution is removed and replaced by water, Find ratio of Water and Lime Now
14. In a mixture of 60 litres, the ratio of milk and water is 2 : 1. If this ratio is to be 1 : 2, then the quantity of water to be further added is:
15. (i) $\frac{a}{b} = \frac{1}{2}$; $\frac{a}{c} = \frac{2}{3}$, then $\frac{a}{b+c} = ?$
(ii) a:b = 3:4, b:c = 8:9, c:d = 10:7 & d:e = 14:3. Find a:e?
16. Jack was planting a tree. He was to dig a hole that was 3 feet deep for every 5 feet of tree height. How deep should he dig the hole for a tree that is 17 feet high?
17. A person distributed "N" number of chocolates among 4 children in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{5} : \frac{1}{8}$, then Which of the following could be the N?
(A)254
(B)278
(C)328
(D)382
18. The positive mean proportional between 64 and 81 is
19. Cost of cylinder is directly proportional to cube of the radius. If radius is tripled then cost of cylinder increases by how many times?
20. Cost of Plutonium is directly proportional to square of its weight. A 40 gms plutonium costs \$16000. It breaks into 3 parts in ratio 1:2:5. Find reduction in cost due to breakage.
21. Oscillation of a pendulum is inversely proportional to square root of its Weight. A 25 gms pendulum oscillates for 40 times then, how many times a 16 gms pendulum will oscillates for?
22. Telephone bill of Mr. Mittal is partly fixed and partly varies linearly with the number of outgoing calls. If the number of outgoing calls is 200, bill generates for \$600, But for 400 calls, it costs \$800. Find costs for Mr. Mittal if he makes 800 outgoing calls?
23. X,Y, Z started a new venture by investing 20,000 each. After 3 months, Mr. X left the business and after 6 months Mr. Y also left the business, But Mr. Z stayed for whole year. After a year, total profit generated in the business was \$3500. Find each partner's share.
24. \$ 600, is distributed among A, B, C such that A gets half as much as what B and C gets together. B gets two- third as much as what C and A gets together. Find share of A?
25. Income of X and Y is in ratio 5 : 4 and their expenses are in the ratio of 3 : 2 respectively. If Mr. X could be able to save \$10,000. Find Savings of Mr. Y?



1. Find the median of all the prime numbers less than 100?

2. Find the minimum value of x if median is 22.

X_i	7	12	19	22	30	35
f_i	8	13	9	a	7	6

3. $A = (x, 8, 10, 25, 50)$ median of list A is 25

Quantity A	Quantity B
x	25

4. A list is comprised of five positive integers: 4, 4, x , 7, y . What is the range of the possible values of the medians?

(A) 2 (B) 3 (C) 6 (D) 7 (E) Cannot be determined

5. The average of five positive integers is less than 20. What is the smallest possible median of this set?

(A) 19 (B) 10 (C) 4 (D) 3 (E) 1

6. List A consist only prime numbers such that their range is even and it has at least 5 distinct prime numbers

Quantity A	Quantity B
Any prime number in the list A	2

7. Quantity A	Quantity B
Range of first 100 positive multiples of 11	Range of 100 consecutive multiples of 11

8. (I)Quantity A	Quantity B
SD of 1 st 10 prime numbers	SD of 1 st 10 odd natural numbers

(II) Quantity A	Quantity B
SD of (24, 34, 44, 54, 64)	SD of (89, 79, 69, 59, 49)

(III) Quantity A	Quantity B
SD of (10, 20, 50, 80, 90)	SD of (10, 30, 50, 70, 90)

9. Four positive integers have a mode of 4 and median of 3. What is their sum?

10. If standard deviation of 10 observations is 0 and one of the observation is 25

Quantity A	Quantity B
Range of 10 observations	0

11. Number of books read by 5500 readers is normally distributed with mean 19 and standard deviation 2. Approximately how many readers have read less than 17 books.

12. In a distribution of 1700 different measurements 'v' is at 73rd percentile. If there are 136 measurements in the distribution that are greater than 'c' but less than 'v', then 'c' is approximately at what percentile in the distribution?

(A) 45th (B) 50th (C) 55th (D) 60th (E) 65th

13. The greatest of the 41 positive integers in a certain list is 52. The Median of the 41 integers is 21. What is the least possible average of the 41 integers?

(A) 8 (B) 10 (C) 12 (D) 20 (E) 21

14. In a set of 77 consecutive integers, median is 70

Quantity A	Quantity B
Least number in the set	32

- 15.** AIIMS conducted a survey to determine how many apples are eaten by 100,000 people during last year. Number of apples eaten by people is normally distributed with a mean of 29 apples and deviation of 4 apples. Approx. how many of the surveyed people ate more than 25 apples in the last year?
(A) 16000 (B) 68000 (C) 84000 (D) 98000
- 16.** Standard deviation on a test was 12 points and the mean was 70 points. If the scores are normally distributed and student X scored 95 points then student X scored higher than approx. what % of the students?
(A) 84% (B) 98% (C) 68% (D) 50%
- 17.** $M = \{n, n+1, n+2, n+3, n+4\}$ where n is greater than 2
Quantity A Quantity B
Standard deviation of the numbers in set M n
- 18.** Sets S and T satisfy the conditions that all the numbers in set S are in set T and the average of numbers in set S is equal to the average of numbers in set T.
Quantity A Quantity B
Standard Deviation of set S Standard Deviation of set T
- 19.** The algebraic sum of the deviations of 10 observations measured from 30 is 50. Find the average of the observations?
(A) 30 (B) 35 (C) 25 (D) Cannot be determined
- 20.** A box contains 30 numbered cards from 1 to 30. 3 cards are drawn at random then find the probability that their median is 10?
- 21.** A box contains 40 numbered cards from 1 to 40. 4 cards are drawn at random then find the probability that their range is 37?
- 22.** Find the interquartile range for the following observations:
(i) 5, 7, 12, 13, 25, 29, 36, 38, 45, 88
(ii) 2, 8, 9, 11, 16, 19, 19, 22, 35, 47, 59, 69
- 23.** In a normally distributed set of data, the mean is 12 and the standard deviation is less than 3
Quantity A Quantity B
Number of data points in the set 68% of the total data points located between 9 & 15
- 24.** Mean and variance of 2 series are given below:
Series A: Mean = 54 and variance = 9 Series B: Mean = 100 and variance = 4 Which series is more stable?
(A) Series A (B) Series B (C) Both are equally stable (D) cannot be determined
- 25.** Average score of 10 students was 5.4 for a particular test. 7 of these students scored 8, 7, 5, 5, 2, 1, 3. What are the possible values of the mode of the marks of all 10 students? (Mark all the correct answer)
(A) 4 (B) 6 (C) 5 (D) 7 (E) 8

Class sheet answer key

Percentage

1. 12.5	2. 10000	3. 30000	4. 1000	5. 76
6. 55	7. 32	8. 20	9. 8	10. 12.5
11. 66000	12. December	13. 25	14. 60	15. 14.28
16. 20	17. 1M	18. 24	19. 40%,96%	20. 1200
21.B	22. 10	23. A,E	24. C	25. B

Profit and Loss

1. 276,7%,323,750	2. 28%	3. D,A	4. 1100	5. 16
6. 16.66	7. 33	8. 22.22	9. 10	10.12.5
11. 150	12. 150	13. 128	14. 11.11	15. 80
16. 30	17. 28.56	18. 48	19. 90	20. 30%,17%
21. 1000	22. 56.25	23. 16	24. 40	25. 80

Ratio

1. 30	2. 105	3. 165	4. C	5. A
6. 25,20	7. $\frac{2}{5}$	8. $\frac{89}{189}$	9. 17	10. 41
11. D	12. 27.27	13. No change, 17:3	14. 60	15. $\frac{2}{7}, \frac{40}{9}$
16. $\frac{51}{5}$	17. B	18. 72	19. 26	20. 8500
21. 50	22. 1200	23. 500,1000,2000	24. 200	25. CNBD

Average

1. 23,178.5,11.6,50,14,92.33	2. 104	3. 19	4. 13	5. 81
6. 90	7. 28.63	8. 17	9. 72	10. 75.5
11. 25	12. A,C,B,C	13. 18	14. A,B,D	15. 13
16. 224	17. D	18. 5	19. 74%	20. 29.16
21. C	22. 130	23. 7	24. 6:1	25. 99

Numbers-1

1. C	2. D	3. A,B,C	4. 2,6,52,1,16,0,4,1	5. C
6. A,C,D	7. 6	8. 0	9. B	10.28
11.13	12.D	13.E	14.D	15.225
16.A	17.22!	18.3600	19. 5	20.39
21. A	22.B	23.720	24.125/2	25.D

Numbers-2

1. 0,0,6,0,4	2. 96, 16	3. (i) 16,5,3 (ii) 28, 9,2	4. 40	5. 121,1/3125
6. 0	7. C	8. 56.5	9. 156.25,1256	10.10 ⁹ ,100
11. (4,132) (1,225), $\left(\frac{4}{21}, \frac{8}{7}\right)$	12.A,C,F	13.120	14.169,41, 132,48	15.A,B,E
16.A	17. 992	18. C,D	19.4	20. 4
21. 200	22. 20	23. 58	24.199	25.18

Statistics

1. 41	2. 18	3. D	4. E	5. E
6. A	7. C	8. A,C,A	9. 11	10. C
11. 880	12. E	13. C	14. C	15. C
16. B	17. B	18. D	19. B	20. $\frac{9}{203}$
21. $\frac{189}{9139}$	22. 26,38	23. A	24. B	25. C,D,E

Geometry

1. 24	2. 135,45	3. A	4. $52 < P < 72$
5. D	6. 16	7. 30	8. 3
9. 108	10. $\frac{4}{49}$	11. $120\sqrt{3}$	12. $\frac{5-x}{10}$
13. $120\sqrt{3}$	14. 171	15. 5	16. $4\sqrt{5}$
17. 350	18. D	19. 17.6	20. B
21. C	22. 80	23. $\sqrt{\left(\frac{10}{\pi}\right)^2 + 10^2}$	24. 150
25. 18	26. 16π	27. 128	28. 48
29. E	30. 21	31. 80	32. $3x - 2y = 3$
33. $-\frac{1}{3}$, 63, 21	34. $2x + 9y = 67$	35. $\frac{1}{2} \times c \times (b - a)$	36. E
37. $y = 2x$	38. 8	39. 1:2 externally	40. $\frac{3}{\sqrt{97}}$

Algebra-1

1. -5	2. 5	3. 140	4. 512	5. A
6. D	7. 40	8. i. No soln ii. $\frac{1}{22}, \frac{-1}{13}$	9. A	10. (4,0) (-9,-6) $\frac{3 \pm \sqrt{6}}{2}$
11. $(x-7)(x+4)=0$ $x^2 - 12x - 20 = 0$ $(2x+3)(x-5)=0$	12. B	13. i. 150 ii. other than 150	14. 3	15. A
16. A,B,E,F	17. 200	18. 1:2:7	19. -1.5	20. 11
21. B	22. C	23. A,D,E	24. 25	25. 6 values