Worksheet
Chapter – 1 – Real Number
Class – X

Points to Remember :-

- Euclid's Division Lemma Given any two positive integers a and b there exist unique integers q and r satisfying a = bq+r and $0 \leq r \angle b$, here, the integers q is called quotient, r the remainder, b the divisor and a the dividend.

- Euclid' Division Algorithm Euclid's division Algorithm is an application of Euclid's Division Lemma. It is technique to compute the HCF of two positive integers.

- Fundamental Theorem of Arithmetic Every composite number can be expressed as a product of primes, and this factorisation is unique, apart from the order in which the prime factors occur.

- For any two positive integers a and b HCF (a, b) $\times$ $LCM\ (a, b) = a \times b$.

Decimal Representation of Rational Numbers For any rational number $\frac{p}{q}$ whose having terminating decimal representation where p and q are co-prime number then prime factorisation of q can be expressed in the form of $(2^m \times 5^n)$ where m and n are non negative integers.

Let x = $\frac{p}{q}$ be a rational number such that p and q are co-prime and prime factorisation of q is not of the form $2^m \times 5^n$ where m and n are non negative integers then x has non terminating repeating decimal expansion.

Level 1

Q1) A rational number between $\sqrt{2}$ and $\sqrt{3}$ is

(a) 1.2 (b) $\sqrt{4}$ (c) 1.5 (d) 1.433171....

Q2) After how many place of decimal the decimal expansion of 43/400 will terminate

(a) 4 (b) 2 (c) 3 (d) 1

Q3) The hcf of the smallest composite number and smallest prime number is

(a) 4 (b) 8 (c) 1 (d) 2

Q4) Hcf and Lcm of a= x3y2 and b= xy3 are

(a) x^4y^5 , xy (b) xy^2, x^3y^3 (c) x^2y^2 , x^4y^4 (d) xy, x^3y^3

Q5) By Euclid's division lemma if a = bq + r , then r must satisfy

(a) $0 \le r < b$ (b) $0 \le r \le b$ (c) $0 < r < b$ (d) $0 < r \le b$

Q6) The Lcm of two coprime numbers is 221, if one number is 17, the other number is

(a) 17 (b) 13 (c)221 (d) 0

Level – 2

Q7) If the HCF of 65 and 117 is expressed in the form of 65M + 117N . Hence find the value of M and N.

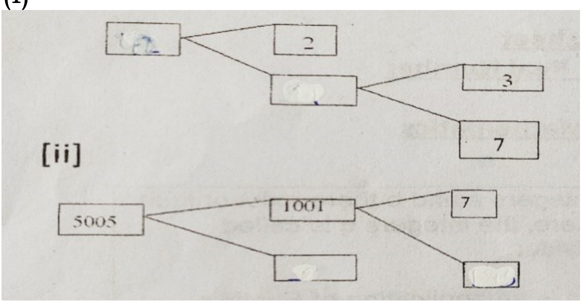
Q8) Prove that $\sqrt{2} + \sqrt{3}$ is an irrational number.

Q9) Show that n2 -1 is divisible by 8 if n is an odd positive integer.

Q10) Prove that one of every three consecutive positive integers divisible by 3.

Q11) Fill in the blanks if the following factor tree :

(i)



Level -3

Q12) Find the largest number that will divide 398,436 and 542 leaving remainder 7,11 and 15 respectively.

Q13) In a seminar the number of participants in Hindi, English and Mathematics are 60,84 and 108 respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject. (HOTS)

Q14) Find the smallest number which leaves remainder 8 and 12 when divided by 28 and 32 respectively.(204).

Q15) On M.G. Road, three consecutive traffic lights change after 36,42 and 72 seconds. If the lights are first switched on at 9.00 a.m. at what time will they change. (9:08:24)

Chapter – 2 Polynomials

Points to Remember :-

1. The exponent of the highest degree term in a polynomial is known its degree.
2. A real number α is a zero of a polynomial f (x) if $f(\alpha)=0$, no. of zeroes = degree of f (x).
3. Geometrically zeroes of a polynomial are the x-coordinates of the points where its graph crosses or touches x axis.
4. If α and β are zeroes of a quadratic polynomial: $P(x)=ax^2+bx+c$, $a \neq o$

   Sum of zeroes = $\alpha+\beta=\frac{-b}{a}$, Product of zeroes = $\alpha\beta=\frac{-c}{a}$

   Also $p(x) = K(x-\alpha)(x-\beta)=K[x^2-(\alpha+\beta)x+\alpha\beta]$

   Extra: $\alpha^2+\beta^2 = (\alpha+\beta)^2-2\alpha\beta$ $\quad (\alpha-\beta)^2=(\alpha+\beta)^2-4\alpha\beta$

   $\frac{1}{\alpha}+\frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta}$ $\quad \frac{1}{\alpha^2}+\frac{1}{\beta^2}=\frac{\alpha^2+\beta^2}{\alpha^2\beta^2}$

   $\alpha^3+\beta^3=(\alpha+\beta)^3-3\alpha\beta(\alpha+\beta)$
5. If α, β and r be the zeroes of a cubic polynomial $P(x)=ax^3+bx^2+cx+d$, $a\neq o$ then $\alpha+\beta+r=\frac{-b}{a}$, $\alpha\beta+\beta r+r\alpha=\frac{c}{a}$ $\quad \alpha\beta r = \frac{-d}{a}$

   Also $ax^3+bx^2+cx+d=k(x-\alpha)(x-\beta)(x-r) = k[x^3-(\alpha+\beta+r)x^2+(\alpha\beta+r\beta+\alpha r)x-\alpha\beta r]$
6. Division algorithm : If p(x) be any Polynomial and any non-zero polynomial g(x) q(x) and r(x) such that p(x) can be expressed as p(x) = g(x).q(x) +r(x)
   1. If r(x)=0, then g(x) is factor of p(x)
   2. Degree r(x) <degree g(x)

Level I

1. If α and β are the zeros of the polynomial $p(x)=4x^2+3x+7$,then $\frac{1}{\alpha}+\frac{1}{\beta}$ is equal to

   (a) $\frac{7}{3}$ (b) $-\frac{7}{3}$ (c) $\frac{3}{7}$ (d) $-\frac{3}{7}$
2. If one zero of the polynomial $f(x)=(k^2+4)x^2+13x+4k$ is reciprocal of the other, then k=

   (a) 2 (b) -2 (c) 1 (d) -1
3. If the product of two zeros of the polynomial $f(x)=2x^3+6x^2-4x+9$ is 3,then its third zero is

   (a) $\frac{3}{2}$ (b) $\frac{-3}{2}$ (c) $\frac{9}{2}$ (d) $\frac{-9}{2}$
4. If x+2 is a factor of $x^2+ax+2b$ and a+b=4, then

   (a) a =1,b=3 (b) a=3,b=1 (c) a=--1 ,b=5 (d) a=5,b=--1
5. A quadratic polynomial,the sum of whose zeros is 0and one zero is 3, is

   (a) x^2-9 (b) x^2+9 (c) x^2+3 (d) x^2-3

Level II

1. If α and β are zeroes of quadratic Polynomial $4x^2+4x+1$, then form a quadratic polynomial whose zeroes are 2α and 2β.
2. Find zeroes of quadratic polynomial $3x^2-2$ and verify the relationship between zeroes and the coefficients.
3. Without actual division show that $2x^4-6x^3+3x^2+3x-2$, is exactly divisible by x^2-3x+2.
4. Obtain all other zeroes of polynomial $x^4-3\sqrt{2}x^3+3\sqrt{2}x-4$ if two of its zeroes are $\sqrt{2}$and $2\sqrt{2}$.
5. Find a quadratic polynomial whose zeroes are $3+\sqrt{5}$ and $3-\sqrt{5}$
6. If α, β are zeroes of polynomial $f(x)=2x^2+5x+k$, satisfying the relation $\alpha^2+\beta^2+\alpha\beta=\frac{21}{4}$, then find value of K.

Level III

1. If x+a is a factor of polynomial x^2+Px+q and x^2+mx+n prove that $a=\frac{n-q}{m-p}$ (HOTS)
2. If polynomial $x^4-6x^3+16x^2-25x+10$ is divided by x^2-2x+k the remainder comes out to be x+a, find k and a. (HOTS)
3. Find polynomial of least degree which should be added from polynomial $x^4+2x^3-4x^2+6x-3$ so that it is exactly divisible by x^2-x+1. (HOTS)
4. Find the condition that zeroes of polynomial $f(x)=x^3-px^2+qx-r$ may be in arithmetic progression. (HOTS)
5. Given that zeroes of cubic polynomial $f(x)= x^3-6x^2+3x+10$ are of the form a, a+b, a+2b for some real numbers a and b, find values of a and b as well as zeroes of given polynomial. (HOTS)

L-3 Pair of Linear Equations in Two Variables

Points to Remember

Pair of linear system of equation	Compare the ratio	Graphical representation	Algebraic representation
$a_1x + b_1y + c_1 = 0$ $a_2x + b_2y + c_2 = 0$	$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$	Intersecting lines	Unique solution (System is consistent)
$a_1x + b_1y + c_1 = 0$ $a_2x + b_2y + c_2 = 0$	$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$	Coincident lines	Infinitely many solutions (System is consistent)
$a_1x + b_1y + c_1 = 0$ $a_2x + b_2y + c_2 = 0$	$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$	Parallel lines	No solution (System is inconsistent)

Level 1

Q1) The pair of equations y=0 and y= -7 has
(a) One solution (b) two solutions (c) infinitely many solutions (d) no solution

Q2) The value of c for which the pair of equations cx – y = 2 and 6x – 2y =4 will have infinitely many solutions is
(a) 3 (b) -3 (c) -12 (d) no value

Q3) The pair of equations 5x – 15y = 8 and 3x – 9y = 24/5 has
(a) Infinite solutions (b) unique solution (c) no solution (d) one solution

Q4) If a pair of equations is consistent, then the lines will be
(a) Parallel (b) always coincident (c) always intersecting (d) intersecting or coincident

Q5) The value of K for which the system of equations x – 2y = 3 and 3x + ky = 1 has a unique solution is
(a) K = -6 (b) all values except -6 (c) k = 0 (d) no value

Q6) The pair of equations x = a and y = b graphically represents the lines which are
(a) Parallel (b) intersecting at (a,b) (c) coincident (d) intersecting at (b,a)

Level 2

Q7) solve for x and y : 217x + 131y = 913, 131x + 217y = 827

Q8) solve graphically : 4x – 5y = 20, 3x + 5y – 15 = 0. Find the coordinates of the vertices of the triangle formed by these lines and y – axis. Also, find its area.

Q9) Seven times a two digit number is equal to four times the number obtained by reversing the order of its digits. If the difference between the digits is 3, then find the number.

Q10) Two places A and B are 120km apart on a highway. A car starts from A and another from B at the same time. If the cars move in the same direction at different speeds, the meet in 6 hours. If they travel towards each other, they meet in in 1 hour 12 minutes. Find the speeds of the two cars.

Q11) 8 men and 12 boys can finish a piece of work in 10 days while 6 men and 8 boys finish it in 14 days. Find the time taken by 1 man alone and 1 boy alone to finish the work.

Level 3

Q12) It can take 12 hours to fill a swimming pool using two pipes. If the pipe of larger diameter is used for 4 hours and the pipe of smaller diameter for 9 hours, only half of the pool be filled. How long would it take for each pipe to fill the tank separately.

Q13) Vijay had some bananas and he divided them into two lots A and B. he sold the first lot at the rate of Rs. 2 for 3 bananas and the second lot at the rate of Rs. 1 per banana and got a total of Rs. 400. If he had sold the first lot at the rate of Rs. 1 per banana and the second lot at the rate of Rs. 4 for 5 bananas, his total collection would have been Rs. 460. Find the total number of bananas he sold. (HOTS)

Q14) After covering a distance of 30km with a uniform speed there is some defect in a train engine and therefore, its speed reduces to 4/5 of its original speed. Consequently the train reaches its destination late by 45 minutes. Had it happened after covering 18km more, the train would have reached 9mins earlier. Find the speed of the train and the distance of journey. (HOTS)

Chapter - 4 QUADRATIC EQUATION

Points to remember

- If we can factorise $ax^2 + bx + c$, a is non zero, into products of two linear factors, then the roots of the quadratic equation $ax^2 + bx + c = 0$ can be found by equating each linear factor to zero.
- Quadratic formula: Roots of equation $ax^2 + bx + c = 0$ are $\frac{-b\pm\sqrt{b^2-4ac}}{2a}$,
  $D = b^2 - 4ac$, D is called the Discriminant.
- The quadratic equation $ax^2 + bx + c = 0$, $a\neq 0$ has
  (i) real roots if $D \geq 0$
  (i) real and distinct roots if $D > 0$
  (ii) real and equal roots if $D = 0$
  (iii) no real roots if $D < 0$

Level 1

Q1) if the equation $9x^2 + 6kx + 4 = 0$ is a perfect square, then k is

(a) 2 (b) -2 (c) ± 2 (d) 0

Q2) if the quadratic equation $ax^2 + bx + c = 0$ has coincident roots, then c =

(a) $-b/a$ (b) b/a (c) $b^2/4a$ (d) $-b^2/4a$

Q3) if α, β are the roots of the quadratic equation $x^2 + x + 1 = 0$, then $1/\alpha + 1/\beta$ *is*

(a) 0 (b) 1 (c) -1 (d) 2

Q4) $(x^2 + 1)^2 - x^2 = 0$ has

(a) 4 real roots (b) 2 real roots (c) no real roots (d) one real root

Q5) which of the following has real roots?

(a) $X^2 - 4x + 3\sqrt{2} = 0$

(b) $X^2 + 4x - 3\sqrt{2} = 0$

(c) $X^2 - 4x - 3\sqrt{2} = 0$

(d) $3X^2 - 4\sqrt{3} + 4 = 0$

Level 2

Q.09 If the equation $kx^2+2x+k=0$ has equal roots, then find **k**.

Q.10 If the sum and the product of the roots of the equation $kx^2 + 6x + 4k = 0$ are equal, then find **k.**

Q.11 A 2-digit number is such that product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.

Q.12 Find the positive value of k, for which f the equation $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real roots.

Q.13 Find the value of k if the sum of the roots of the equation $x^2 - (k+6)x + 2(2k-1) = 0$ is equal to half of their product.

Level 3

Q.14 One-fourth of a herd of camels was seen in the forest. Twice the square root of the herd has gone to mountains and the remaining 15 camels were seen on the bank of the river. Find the total number of camels. (HOTS)

Q.15 If $x = \sqrt{2 + \sqrt{2 + \sqrt{2 + \cdots \ldots . \ddots \infty}}}$, find x.

Q.16 Solve for x: $4(x-(1/x))^2 - 4(x+(1/x)) + 1 = 0$, $x \neq 0$ (HOTS)

Q.17 Solve for x: $1/(a+b+x) = 1/a + 1/b + 1/x$

Chapter-5 Arithmetic Progressions

Points to Remember

- An arithmetic progression is a list of numbers in which each term is obtained by adding a fixed number "d" to the preceeding term, except the first term. The fixed number "d" is called the common difference.
- The general form of an A.P. is a, a+ 2d, a+ 3d………
- In an A.P. with the first term as "a" and common difference "d", the nth term (general term) is given by
  $a_n = a + (n - 1) d$.
- The sum of first "n" term of an A.P. is given by $S = \frac{n}{2}$ (2a+ (n-1)d)
- If "I" is the last term of the finite A.P., say the nth term, then the sum of all terms of the A.P. is given by

  $S = \frac{n}{2}$ (a + l)

Level 1

Q1 If the sum of n terms of an A.P. be $3n^2+n$ and its common difference is 6,then its first term is

(a) 2 (b) 3 (c) 1 (d) 4

Q2 The first and last terms of an A.P.are 1and 11.If the sum of its terms is 36,then the number of terms will be

(a) 5 (b) 6 (c) 7 (d) 8

Q3 If $\frac{1}{X+2}, \frac{1}{X+3}, \frac{1}{X+5}$ are in A.P. then x =

(a) 5 (b) 3 (c) 1 (d) 2

Q4 Two A.P.'s have the same common difference. The first term of one of these is 8 and that of the other is 3. The difference between their 30^{th} term is

(a) 11 (b) 3 (c) 8 (d) 5

Q5 If 18^{th} and 11^{th} term of an A.P. are in the ratio 3 : 2, then its 21^{st} and 5^{th} terms are in the ratio

(a) 3 : 2 (b) 3 : 1 (c) 1 : 3 (d) 2 : 3

LEVEL II :.

Q6 Determine the 10^{th} term from the end of the AP 4,9,14…..254.

Q7 If the m^{th} term of an AP is 1/n and n^{th} term is 1/m, then prove that sum of $(mn)^{th}$ term is $\frac{1}{2}$ (mn + 1).

Q8 If m times the m^{th} term is equal n times the n^{th} term. Show that $(m+n)^{th}$ term is 0.

Q9 In an AP the sum of m terms is equal to sum of n terms. Prove the sum of (m+n) term is 0.

Q10 If the m^{th} term of an AP is 1/n and n^{th} term is 1/m. Prove $(mn)^{th}$ is 1.

Q11 If p^{th} term of an AP is q and q^{th} term is p. Prove that n^{th} term is (p + q – n)

<u>LEVEL III :</u>

Q12 The ratio of sum of m and n terms of an AP is $m^2 : n^2$. Show that the ratio of m^{th} and n^{th} term is (2m – 1) : (2n – 1). (HOTS)

Q13 If p^{th} , q^{th} , r^{th} term of an AP are a, b, c then show that

$a(q - r) + b(r - p) + c(p - q) = 0$ (HOTS)

Q14 If $\frac{a + b}{a + b}$ is the arithmetic mean between a and b, find n. (HOTS)

Q15 The sum of n, 2n, 3n terms of an AP are S_1, S_2, S_3. Then prove that $S_3 = 3 (S_2 - S_1)$. (HOTS)

Q16 Divide 32 into 4 parts which are in AP. Such that product of extremes to the product of means is 7 : 15. (HOTS)

Q17 150 workers were engaged to finish a piece of work in a certain no of days. 4 workers dropped on 2^{nd} day, 4 more workers dropped on 3^{rd} day on so on. It takes 8 more days to finish the work now. Find the no of days in which the work will be completed. (HOTS)

CH – 6 TRIANGLES CLASS X

Points to Remember

- If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points , the other two sides are divided in the same ratio.
- If a line joining any two sides of a triangle divides the sides proportionally then the line is parallel to the third side
- If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio and hence the two triangles are similar (AAA similarity criterion).
- If in two triangles, two angles of one triangle are respectively equal to the two angles of the other triangle, then the two triangles are similar (AA similarity criterion).
- If in two triangles, corresponding sides are in the same ratio, then their corresponding angles are equal and hence the triangles are similar (SSS similarity criterion).
- If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are in the same ratio (proportional), then the triangles are similar (SAS similarity criterion).
- The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.
- If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse, then the triangles on both sides of the perpendicular are similar to the whole triangle and also to each other.
- In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides (Pythagoras Theorem).
- If in a triangle, square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle.

Level-1

1. A man goes 80 m due east and then 150 m due north. How far is he from the starting point?
   (a) 170 m (b) 155 m (c) 140 m (d) 120 m
2. In ΔABC, DE II BC, so that AD= 24 cm, AE = 32 cm and EC = 4.8 cm. Then AB is equal to ?
   (a)6 cm (b) 16 cm (c) 3.6 cm (d) 6.4 cm
3. In ΔABC ,DE II BC, so that AD = (7x-4) cm, AE = (5x-2) cm , DB = (3x+4) cm and EC = 3x. The value of x is ?
   (a)3 cm (b) 5 cm (c) 2.5 cm (d) 4 cm
4. In ΔABC, AD is the internal bisector of of angle A. If BD = 5 cm, BC = 7.5 cm, then AB : AC is ?
   (a)1:2 (b) 2:1 (c) 4:5 (d) 1:1
5. If the bisector of an angle of a triangle bisects the opposite side, then the triangle is
   (a)isosceles (b) equilateral (c) scalene (d) right angled
6. Sides of two similar triangles are in ratio 4:9, then areas of these triangles are in the ratio

(a)2:3 (b) 4:9 (c) 81:16 (d) 16:81

7. If in ΔABC and ΔDEF, $\frac{AB}{DE} = \frac{BC}{FD}$, then ΔABC~ΔDEF when

(a) ∠A= ∠F (b) ∠A = ∠D (c) ∠B= ∠D (d) ∠B= ∠E

Level -2

8. Through the midpoint M of the side CD of a parallelogram ABCD, the line BM is drawn intersecting AC in L and AD produced in E. Prove that EL = 2 BL. (figure 1)
9. In ΔABC , if AD is perpendicular to BC and AD^2 = BDxDC, prove that ∠BAC is 90^0 .

10. D and E trisect BC. Prove that $8AE^2 = 3AC^2 + 5 AD^2$. (figure 2)

Level-3

11. ABC is a right angled triangle, right angled at C. Let BC = a, CA = b, AB = c and let p be the length of perpendicular from C on AB, Prove that (i) CP = ab (ii) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$. (fig 3) (**HOTS**)

12. In the trapezium ABCD, AB ∥ DC and DC = 2AB. EF drawn parallel to AB cuts AD in F and BC in E, such that $\frac{BE}{EC} = \frac{3}{4}$. Diagonal DB intersects EF at C. Prove that 7 FE = 10 AB. (fig 4) (**HOTS**)
13. PA, QB,RC and SD are all perpendiculars to a line l, AB=6 cm , CD=12 cm and SP=36 cm. Find PQ,QR and RS.(fig5) (**HOTS**)

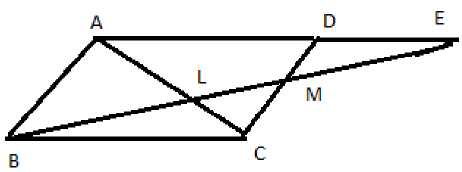


Figure 1

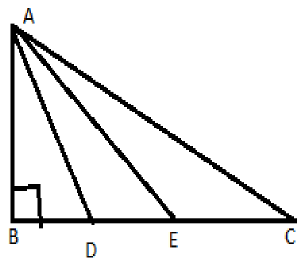


Figure 2

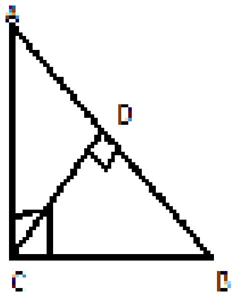


Figure 3

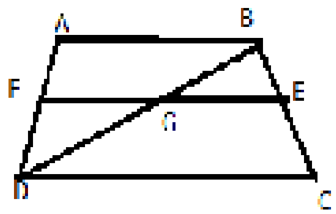


Figure 4

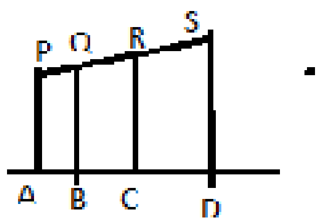


Figure 5

Chapter – 7 Coordinate Geometry

Points to Remember

- Two perpendicular lines X'OXandY'OY intersecting at O are called the x-axis and y-axis.

respectively.

- These two axes divide them into four quadrants.
- A point located in a plane has two coordinates, namely the x-coordinate(also called abscissa) and the y-coordinate(also called ordinate)
- The distance (d)between the points A(x1,y1)and B(x2,y2)is given by
  - d= $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ [Distance Formula]

- The coordinates of a point P(x,y) which divides a line segment AB internally in a given

ratio m1:m2 where the coordinates of A are (x1,y1) and those of B (x2,y2)are given by

- $x = \frac{m2x1+m1x2}{m1+m2}$, $y = \frac{m2y1+m1y2}{m1+m2}$ [Section Formula]

- If A (x1,y1)and B (x2,y2) be the two end points of the line segment AB, then the coordinates of mid point of AB are: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$
- The coordinate (x,y) of the centroid of a triangle with vertices A(x1,y1), B(x2,y2)

and C (x3,y3)is given by $x = \frac{x1+x2+x3}{3}$, $y = \frac{y1+y2+y3}{3}$

- The area of the triangle ABC is given byΔ =1/2 |x1(y2–y3)+x2(y3–y1)+x3(y1–y2)|

- The three points A(x1,y1),B(x2,y2)and C(x3,y3) are collinear if and only if area of Δ=0

i.e. 1/2 |x1(y2–y3)+x2(y3–y1)+x3(y1–y2)| = 0

Level 1

Q1) the distance of the point P(4,-3) from the origin is

(a) 1 unit (b) 7 units (c) 5 units (d) 3 units

Q2) the coordinates of the centroid of triangle ABC with vertices (-1,0), (5,-2) and (8,2) is

(a) (12,0) (b) (6,0) (c) (0,6) (d) (4,0)

Q3) what is the mid point of a line with end points (-3,4) and (10,-5)?

(a) (-13,-9) (b) (-6.5, -4.5) (c) (3.5, -0.5) (d) none

Q4) y axis divides the join of P(-4,2) and Q(8,3) in the ratio

(a) 3:1 (b) 1:3 (c) 2:1 (d) 1:2

Q5) area of the triangle formed by (1,-4), (3,-2) and (-3,16) is

(a) 40 sq units (b) 48 sq units (c) 24 sq units (d) none

Level 2

Q6) find the value of k, if the point P(2,4) is equidistant from the points (5,k) and (k,7).

Q7) prove that (4,-1), (6,0), (7,2) and (5,1) are the vertices of a rhombus. Is it a square?

Q8) if the points A(-2,1),B(a,b) and C(4,-1) are collinear and a-b=1. Find the value of a and b.

Q9) if (3,3), (6,y), (x,7) and (5,6) are the vertices of a parallelogram taken in order, find the values of x and y.

Q10) the area of a triangle is 5 sq. units. Two of its vertices are (2,1) and (3,-2). If the third vertex is (7/2,y), find the values of y.

Q11) if P(x,y) is any point on the line joining the points A(a,0) and B(0,b) then show that x/a + y/B =1

Level 3

Q12) the line segment joining the points A(2,1) and B(5,-8) is trisected at the points P and Q such that P is nearer to A. if P also lies on the line given by 2x-y+k=0, find k.

Q13) if the centroid of the triangle formed by the points A(a,b), B(b,c) and C(c,a) is at the origin. What is the value of $a^2/3bc + b^2/3ca + c^2/3ab$?

Q14) three villages are located around the circle at (1,2),(3,-4) and (5,-6). A health centre should be located at a point so that all three villages can reach the centre in the same distance. Find the point at which the health centre can be located.

Q15) prove that the area of a triangle with vertices (t,t-2), (t+2,t+2) and (t+3,t) is independent of t.

Chapter – 8 Introduction to Trigonometry

Points to Remember

In a right triangle: Trigonometric ratios

Sin A = $\frac{Opp}{Hyp}$, cos A = $\frac{Adj}{Hyp}$, tan A = $\frac{Opp}{Adj}$

Where Opp – side opposite to angle A

Adj- side adjacent to angle A, Hyp – hypotenuse

Cosec A = $\frac{1}{\sin A}$, sec A = $\frac{1}{\cos A}$, cot A = $\frac{1}{\tan A}$

Trigonometric ratios of Complementary Angles:-

Sin(90^0 – A) = cos A; cos(90^0 – A) = sin A; tan(90^0 – A) = cot A

Cot(90^0 – A) = tan A; sec(90^0 – A) = cosec A; cosec(90^0 – A) = sec A

Trigonometric identities:-

(a) $\sin^2A + \cos^2A = 1$ (b) $\sec^2A - \tan^2A = 1$ (c) $\text{cosec}^2A - \cot^2A = 1$.

Trigonometric table:

Angle A	0^0	30^0	45^0	60^0	90^0
Sin A	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
Cos A	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
Tan A	0	$\frac{1}{\sqrt{3}}$	1	√3	Not defined
Cosec A	Not defined	2	√2	$\frac{2}{\sqrt{3}}$	1
Sec A	1	$\frac{2}{\sqrt{3}}$	√2	2	Not defined
Cot A	Not defined	√3	1	$\frac{1}{\sqrt{3}}$	0

Level 1

Q1) If ABC is right angled at C then the value of cos(A + B)

(a) 0 (b) 1 (c) ½ (d) $\sqrt{3}/2$

Q2) Given that sin A = ½ and cos B = ½ , find sin (A+B).

(a) 1 (b) $\sqrt{3}/2$ (c) 0 (d) ½

Q3) If Cos 9A = sin 9A and 9A < 90, then find the value of tan 6A is

(a) $1\sqrt{3}$ (b) $\sqrt{3}$ (c) 1 (d) 0

Q4) If sin A + $\sin^2$ A = 1 then find the value of expression ($\cos^2$A + $\cos^4$A) is

(a) 1 (b) ½ (c) 2 (d) 3

Q5) the value of tan1tan2tan3……….tan89. is

(a) 0 (b) 1 (c) ½ (d) 2

Q6) if cos (A +B) = 0 then sin(A-B) can be reduced to

(a) cosB (b) cos 2B (c) sin A (d) sin 2A

Level 2

Q7) if sin $(X-20)^0$ = cos $(3x-10)^0$ then find the value of x.

Q8) if x = $a\cos\theta$, y= $b\sin\theta$ then find the value of $b^2x^2 + a^2y^2 - a^2b^2$

Q9) If secA=2x and tanA=2/x, find the value of $2(x^2-1/x^2)$

Q10) If tan A = $\sqrt{2}$ - 1 Show that $\frac{\tan A}{1+tan^2\ A} = \frac{\sqrt{2}}{4}$

Q11) Using tan (A+B) = $\frac{\tan A+\tan B}{1-\tan A \tan B}$ find the value of tan 75°.

Q12)If $x\ tan^2 60° + 3Sin^2 60 - \frac{3}{4}\ tan^2 30° = 6\ Find\ x$.

Level 3

Q13) If $Cos\theta + Sin\theta = \sqrt{2}\ Cos\theta\ Prove\ that\ Cos\theta - Sin\theta = \sqrt{2}\ Sin\theta$.

Q14) If $a\ Cos\theta - b\ Sin\theta = c\ Prove\ that\ a\ Sin\theta + b\ Cos\theta = \pm\sqrt{a^2 + b^2 - c^2}$

Q15) If $Sec\theta = x + \frac{1}{4x}\ prove\ that\ tan\theta + Sec\theta = 2x\ or\ \frac{1}{x}$

Q16) If $\tan\theta + Sin\theta = m\ and\ tan\theta - Sin\theta = n\ Show\ that$

$m^2 - n^2 = \pm 4\sqrt{mn}$

Q17) Prove that $\frac{1}{CosecA+CotA} - \frac{1}{Sin\ A} = \frac{1}{Sin\ A} - \frac{1}{CosecA-Cot\ A}$

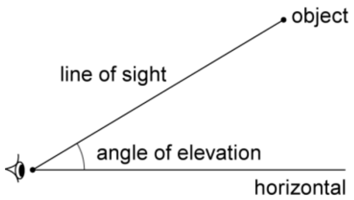
Q18) Prove that ; $\sqrt{\frac{sec\theta-1}{sec\theta+1}} + \sqrt{\frac{sec\theta+1}{sec\theta-1}}$ = 2 cosecθ

Q19) If tanA = ntanB and sinA = msinB then prove that $\cos^2A = \frac{m^2-1}{n^2-1}$

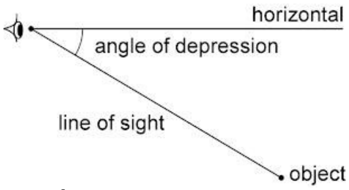
Q20. Evaluate $\frac{\sec 41 sin 49+\cos 29 cosec 61-2/\sqrt{3}(\tan 20\tan 60\tan 70)}{3(sin^2 31+sin^2 59)}$

CH-9 SOME APPLICATIONS OF TRIGONOMETRY CLASS – X

Points to Remember



- The angle of elevation of an object viewed, is the angle formed by the line of sight with the horizontal when it is above the horizontal level.



- The angle of depression of an object viewed is the angle formed by the line of sight with the horizontal when it is below the horizontal level.

Level-1

1. The height of a tower is 10 m. the length of the shadow when Sun's altitude is 45°?
   (a) 15 m (b) 10 m (c) 20 m (d) 15 m
2. If the ratio of the height of a tower and the length of it's shadow is $\sqrt{3}$: 1, then the angle of elevation of the Sun is?
   (a) 30^0 (b) 60^0 (c) 45^0 (d) 90^0
3. When an observer looks from a point O at an object P, the line OP is called ________.
4. The height of an object or the distance between distant objects can be determined with the help of _________ .
5. A ladder 15 cm long makes an angle of 60^0 . The height of the point where the ladder touches the wall is (a) 1.5 m (b) 6 m (c) 7.5 m (d) 8.3 m
6. At some time of the day the length of the shadow of a tower is equal to its height. The Sun's at that time is (a) 30^0 (b) 60^0 (c) 45^0 (d) 90^0

Level-2

7. At a point on level ground, the angle of elevation of a vertical tower is found to be such that its tangent is 5/12. On waking 192 metres towards the tower, the tangent of the angle of elevation is 3/4. Find the height of the tower. [180m]
8. From the top of a hill, the angle of depression of two consecutive kilometer stones due east are found to be 30° and 45°. Find the height of the hill. [1.36km]
9. The shadow of a flag staff is three times as long as the shadow of the flag staff when the sunrays meet the ground at an angle of 60°. Find the angle between the sunrays and the ground at the time of longer shadow. [30°]
10 . A man on the deck of a ship, 12m above water level, observes that the angle of elevation of the top of a cliff is 60° and the angle of depression of the base of the cliff is 30°. Find the distance of the cliff from the ship and the height of the cliff.
    [$10\sqrt{3}$ m , 40m]

Level-3

11. A carpenter makes a stool for electrician with a square top of side 0.5m and at a height of 1.5m above the ground. Also, each leg is inclined at an angle of 60° to the ground. Find the length of each leg and also the lengths of two steps to be put at equal distances. [1.732 m,1.1077 m, 1.654 m]
    (**HOTS**)
12. A ladder rests against a wall at an angle α to the horizontal. Its foot is pulled away from the wall through a distance 'a' , so that it slides a distance 'b' down the wall making an angle β with the horizontal.
    Show that : $\frac{a}{b} = \frac{\cos\alpha - \cos\beta}{\sin\beta - \sin\alpha}$. (**HOTS**)
13. The angle of elevation of a cloud from a point 60m above a lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60°. Find the height of the cloud.
    [120m] (**HOTS)**

Chapter-10 CIRCLES

Point To Remember :

- The tangent to a circle is perpendicular to the radius through the point of contact.
- The lengths of the two tangents from an external point to a circle are equal.

LEVEL 1 :

1. If AB is tangent at P to a circle whose center is O and OA = 5cm, OP = 3cm, what is the length of tangent segment PB.
   (a) 1 (b) 2 (c) 3 (d) 4
2. Number of tangent drawn at a point of the circle is/are:
   (a) 1 (b) 2 (c) none (d) infinite
3. The tangent drawn at the extremities of the diameter of a circle are:
   (a) Perpendicular (b) parallel (c) equal (d) none of these
4. If PA and PB are tangents from an outside point P, such that PA = 10cm and APB = 60^o, what is the length of chord AB.
   (a) 5 (b) 10 (c) 15 (d) 20

LEVEL 2 :

1. If from an external point B of a circle with centre O, two tangents BC and BD are drawn such that ∠ DBC = 120°, prove that BC + BD = BO, i.e., BO = 2BC.
2. Prove that a parallelogram circumscribing a circle is a rhombus.
3. From an external point P, two tangents PA and PB are drawn to the circle with centre O. Prove that OP is the perpendicular bisector of AB.

LEVEL 3 :

1. Prove that the tangents drawn at the ends of a chord of a circle make equal angles with the chord.
2. Prove that the tangents at the extremities of any chord make equal angles with the chord.
3. The incircle of Δ ABC touches the sides BC, CA and AB at B,E and F respectively. Show that AF + BD + CE = AE + BF + CD = $\frac{1}{2}$ (Perimeter of Δ ABC).
4. The circle is touching the side BC of Δ ABC at P and touching AB and AC produced at Q and R respectively. Prove that AQ = = $\frac{1}{2}$ (Perimeter of Δ ABC).

Chapter-11 Construction

Level-1

1. Locate a point on the line segment of length 10 cm which divides it internally in the ratio 3:7.
2. Draw a circle of radius 4.5cm with center o. Draw a diameter POQ, through P or Q draw tangent to the circle.

Level-2

1. Construct a Triangle ABC in which AB=5 cm, BC=4cm and angle ABC =60 ˚. Construct Triangle ABC with its sides equal to $\frac{3}{5}$ of the corresponding sides of triangle AB .
2. Construct a circle of radius 3.5 cm, draw two tangents to this circle such that the angle between them is 60˚.
3. Draw a triangle ABC with sides BC=7cm, AB=6 cm And angle ABC= 45˚.Construct another triangle whose sides are $\frac{3}{2}$ of the corresponding sides of triangle ABC .
4. Draw a pair of tangents to a circle of radius 6cm which are inclined to each other at angle of 45˚.
5. Let PQR be a right-angled triangle in which PQ=3cm , QR=4cm and angle Q =90˚. QS is the perpendicular from Q on PR. The circle through Q,R,S is drawn. Construct the tangents from P to this circle.

Chapter-12 Area related to Circle

Point To Remember :

- For a circle of radius r, circumference = 2πr units; and Area = πr^2 sq units.
- The area of a circular ring bounded by two concentric circles of radii R and r (R > r) = $[\pi R^2 - \pi r^2]$ sq units.
- Area of sector of circle with central angle θ° = $\frac{\theta°}{180°} \times \pi r^2$ Sq units.
- Perimeter of sector of a circle with central angle θ° = $(\frac{\pi\theta°}{180°} + 2)$ r units.
- Area of a minor segment subtending angle θ° (θ° < 180°) at the centre = $r^2\left(\frac{\pi\theta°}{360°} - \frac{\sin\theta}{2}\right)$ sq units.
- Length of the arc of a circle = $\frac{\theta}{360} \times 2\pi r$

LEVEL - 1

Q1) The area of the circle that can be inscribed in a square of side 6cm is
(a) 36 *Π* (b) 18 *Π* (c) 12 *Π* (d) 9 *Π*
Q2) If the perimeter of semi-circular protractor is 36cm. find the diameter
(a) 14cm (b) 16cm (c) 18cm (d) 12cm
Q3) The perimeter of a sector of a circle or radius 5.6cm is 27.2cm. find the area of a sector.
(a) 44cm (b) 44.6cm (c) 44.8cm (d) none of these
Q4) a steel wire when bent in the form of a square encloses an area of 121 sq cm. the same wire is bent in the form of a circle, find the area of the circle
(a) 111cm^2 (b) 184cm^2 (c) 154cm^2 (d) 259cm^2
Q5) O is the centre of a circle. The area of a minor sector OAB is 5/18 of the area of the circle. Then the value of central angle of minor sector is
(a) 100 (b) 40 (c) 120 (d) 150
Q6) the difference between circumference and radius of a circle is 37cm. the area of the circle is
(a) 111cm^2 (b) 184cm^2 (c) 154cm^2 (d) 259cm^2

LEVEL – 2

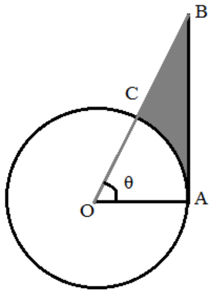
Q 7) In an equilateral triangle of side 24 cm, a circle is inscribed touching its sides. Find the area of the remaining portion of the triangle. ($\sqrt{3} = 1.732$).
Q8) OABC is a rhombus whose three vertices A,B and C be on a circle with centre O. If this radius of the circle is 10cm. Find the area of rhombus.
Q9) In figure ABC is right angled triangle, right angled at A. Semicircles are drawn on AB, AC and BC as diameter. Find the area of shaded region.
Q 10) ABC is a right triangle, right angled at A. Find the area of shaded region if AB=6cm BC=10cm and O is the centre of the incircle of $\Delta\, ABC$.
Q11) Two circle touch internally. The sum of their areas is $116\pi\ cm^2$ and distance between their centres is 6 cm. Find the radius of the circles.

LEVEL – 3

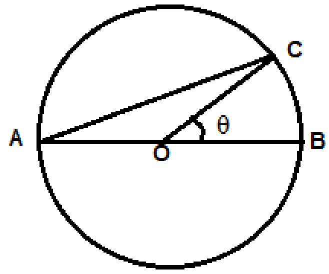
Q 12) The given figure shows a sector of circle with centre O containing an $\angle\theta$. Prove that

i) Perimeter of the shaded region is $r[\tan\theta + \sec\theta + \pi\theta/180]$.

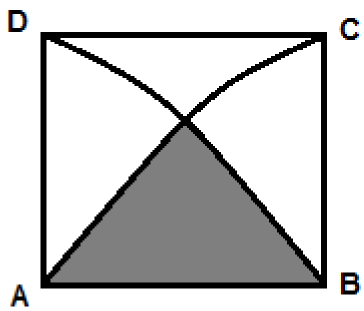
ii) area of the shaded region $\{\frac{r^2}{2}(tan\theta - \left(\frac{\pi\theta}{180}\right)\}$ (HOTS)



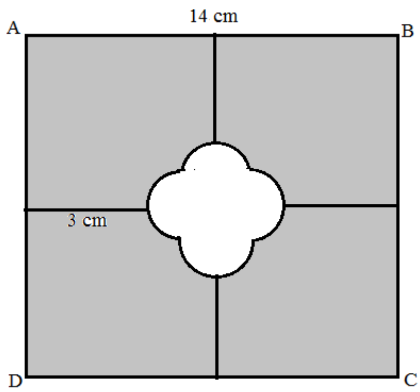
Q13) AB is a diameter of a circle with centre OC is a point on the circle such that $\angle COB = \theta$ The area of the minor segent cut off by AC is equal to twice he area of the sector BOC. Prove that $\sin(\frac{\theta}{2})\ \cos\left(\frac{\theta}{2}\right) = \pi\left\{\frac{1}{2} - \theta/120\right\}$.
(HOTS)



Q14) In the given figure ABCD is a square with side 4 cm. Find he area of shaded region.



Q15) find the area of the shaded portion in the given figure where ABCD is a square of side 14cm. (HOTS)



CH: 13 Surface area & Volume
CLASS – X

Points to Remember			
Type of solid	**Lateral/Curved Surface area**	**Total Surface Area**	**Volume**
Cube	$4(side)^2$	$6(side)^2$	$(side)^3$
Cuboid	$2h(l+b)$	$2(lb+bh+hl)$	$l \times b \times h$
Cylinder	$2\pi rh$	$2\pi r(h+r)$	$\pi r^2 h$
Cone	πrl **,** where $l=\sqrt{(h)^2+(r)^2}$	$\pi r(l+r)$	$\frac{1}{3}\pi r^2 h$
Sphere	---	$4\pi r^2$	$\frac{4}{3}\pi r^3$
Hemisphere	$2\pi r^2$	$3\pi r^2$	$\frac{2}{3}\pi r^3$
Frustum	$\pi l(r_1+r_2)$, where $l=\sqrt{(h)^2+(r_1-r_2)^2}$	$\pi l(r_1+r_2)+\pi r_1^2+\pi r_2^2$	$\frac{1}{3}\pi h(r_1^2+r_1^2+r_1r_2)$

LEVEL -1

Q1) The area of three adjacent faces of a cube is x,y and z. its volume v is
(a) v=xyz (b) v^3=xyz (c) v^2= xyz (d) $v=x^2y^2z^2$

Q2) A cylinder, a cone and a hemisphere are of same base and same height. The ratio of their volumes is
(a) 1:2:3 (b) 2:1:3 (c) 3:1:2 (d) 3:2:1

Q3) The radii of the ends of a frustum of a cone 40cm high are 38cm and 8cm. the slant height of frustum of cone is
(a) 50cm (b) $10\sqrt{7}$ cm(c) 60.96cm (d) $4\sqrt{2}$ cm

Q4) The volume and surface area of a sphere are numerically equal then the radius of the sphere is
(a) 0 unit (b) 1 unit (c) 2 units (d) 3 units

Q5) Base radius of two cylinders are in the ratio 2:3 and their heights are in the ratio 5:3. The ratio of their volumes is
(a) 27:20 (b) 25:24 (c) 20:27 (d) 15:20

Level 2

Q6) A semi circular sheet of metal of diameter 28 cm is bent into an open conical cup. Find the depth and capacity of the cup. Ans (622.16 cm^2)
Q7) Find the volume of largest right circular cone that can be cut out of a cube whose edge is 9 cm.
Q8) If h, C and V respectively are the height, CSA and Volume of cone prove that: $3\pi V h^2 - C^2h^2 + 9V^2 = 0$
Q9) The volume of two sphere are in ration 64:27. Find their radius if the sum of their radius is 21 cm.
Q10) The largest cone is curved out from one face of solid cube of 21 cm. Find the volume of the remaining solid.
Q11) The surface areas of sphere and a cube are equal. Prove that their volumes are in the ration 1 : $\sqrt{\pi}/6$.

Level 3

Q12) The height of a cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be $\frac{1}{27}$ of the volume of the given cone at what height above the base is the section made? (HOTS)
Q13) A hollow cone is cut by a plane parallel to the base and the upper portion is removed. If the curved surface of the remainder is $\frac{8}{9}$ of curved surface of the whole cone. Find the ratio of the line segments into which the cone's altitude is divided by the plane. (HOTS)
Q14) A solid wooden toy is in the form of a hemisphere surmounted by a cone of same radius. The radius of hemisphere is 3.5 cm and total wood used in the making of toy is $166\frac{5}{6}cm^3$. Find the height of the toy.
Q15) The barrel of a fountain-pen, cylindrical in shape is 7 cm long and 5 mm in diameter. A full barrel of ink in the pen is used up on writing 330 words on an average. How many words would use up a bottle of ink containing one fifth of a litre?
Q16) 50 circular plates, each of radius 7 cm and thickness $\frac{1}{2}$ cm, are placed one above another to form a solid right circular cylinder. Find the total surface area and the volume of the cylinder so formed.

Chapter-14 Statistics

Points to Remember

Mean of individual series, $\overline{x} = \frac{\sum_{i=1}^{n} x_i}{n}$.

Mean of ungrouped frequency distribution, $\overline{x} = \frac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i}$, where x_i is the variate.

Mean of grouped frequency distribution, $\overline{x} = \frac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i}$, where x_i is the class mark of the corresponding class.

Assumed Mean Method:

$$\overline{x} = A + \frac{\sum_{i=1}^{n} f_i d_i}{\sum_{i=1}^{n} f_i} \text{ where } d_i = x_i - A \text{ and } A \text{ is the assumed mean.}$$

Step Deviation Method:

$$\overline{x} = A + \frac{\sum_{i=1}^{n} f_i u_i}{\sum_{i=1}^{n} f_i} \times h \text{ where } u_i = \frac{x_i - A}{h} \text{ and } A \text{ is the assumed mean, } h \text{ - class size}$$

Mode of the Grouped Data:

Mode = $l + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times h$

Where l is the lower limit of the modal class

f_1 is the frequency of the modal class

f_0 is the frequency of the class preceding the modal class

f_2 is the frequency of the class succeeding the modal class

h is the width of the modal class

Median of the Grouped Data:

Median = $l + \dfrac{\frac{N}{2} - c}{f} \times h$

Where *l* is the lower limit of the median class

f is the frequency of the median class

c is the cumulative frequency of the class preceding the median class

N is the sum of all frequencies

h is the width of the median class

Level 1

1. The cumulative frequency table is useful in determining:
   (a) Mean (b) Median (c) Mode (d) all of these
2. Find the value of *x*, if the *mode* of the following data is *25*.
   15, 20, 25, 18, 14, 15, 25, 15, 18, 16, 20, 25, 20, *x*, 18
   (a) 15 (b) 25 (c) 18 (d) 16
3. The abscissa of the point of intersection of the less than type and of the more than type cumulative frequency curves of a group data gives its:
   (a) Mean (b) Median (c) Mode (d) none of these
4. Mean of 100 items is 49. It was discovered that three items which should have been 60, 70, 80, were wrongly read as 40, 20, 50 respectively. The correct mean is:
   (a) 48 (b) 49 (c) 50 (d) 60
5. If the arithmetic mean of x, x + 3, x + 6, x + 9 and x + 12 is 10, then x =?
   (a) 1 (b) 2 (c) 6 (d) 4

Level 2

Q.06 Find the value of *p*, if the mean of the following distribution is *20.*

x	15	17	19	$20 + p$	23
f	2	3	4	$5p$	6

Q.07 The mean weight of 100 students in a class is *46Kg.* The mean weight of the boys is *50Kg* and of girls is *40Kg*. Find the number of boys in the class.

Q.08 The following table shows the ages of the patients of economical weaker sections of society provided free treatment in a private hospital during a year. Find the *mode* of the data.

Ages (yrs)	5 – 15	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65
No. of patients	6	11	21	23	14	5

Also calculate the *median* using the empirical formula, if the mean of the data is given as *35.5.* What value is indicated from this data?

Q.09 The class marks of a frequency distribution are 6, 10, 14, 18, 22, 26, and 30. Find the class size.

Q.10 If the median of the distribution given below is *14.4*, find the value of *x* and *y*, if the sum of the frequency is *20*.

Class Interval	0 – 6	6 – 12	12 – 18	18 – 24	24 – 30
Frequency (*f*)	4	*x*	5	*y*	1

Level 3

Q.11 The following distribution gives the daily income of *50* workers of a factory:

Daily Income (Rs.)	200 – 250	250 – 300	300 – 350	350 – 400	400 – 450	450 – 500
No. of workers	10	5	11	8	6	10

Convert the distribution to a less than type cumulative frequency distribution and draw its ogive. Hence, obtain the *median* of daily income. What value is indicated from these data of the factory? What value is lacking in this factory.

Q.12 The data regarding the height of *50* girls of class X of a school is given below:

Height (cms)	120 – 130	130 – 140	140 – 150	150 – 160	160 – 170	Total
No. of girls	2	8	12	20	8	50

Change the above distribution to 'more than type' distribution. Draw graph also.

Q.13 The mode of the following data is 33.5 and the total frequency is 100, find the missing frequency x and y.

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	7	12	x	28	y	9

Q.14 Compare the modal ages of two groups of students A and B for an entrance test:

Age (years)	No. of students	
	Group A	Group B
16 – 18	50	54
18 – 20	78	89
20 – 22	46	40
22 – 24	28	25
24 – 26	23	17

Q.15 The mean of the following distribution given below is *62.8*, find the missing frequency.

Class Interval	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120
Frequency (*f*)	5	8	-	12	7	8

Chapter- 15 Probability

Points to Remember

- The Probability of an event E is a number $P(E)$ such that $P(E) \leq 1$.
- For any event E, $P(E) + P(\bar{E}) = 1$, where $\bar{E}$ stands for *'not E'*.
- The event having only one outcome is called an elementary event.
- The probability of an event E written as $P(E)$ is given by
  $P(E) = \dfrac{\text{Number of outcomes favorable to E}}{\text{Total number of outcomes}}$

Level - 1

Q.01 What is the sum of the probabilities of all events of a trial?
(a) 0 (b) 1 (c) 2 (d) none of these

Q.02 What is the probability that a randomly taken leap year has 52 Sundays
(a) 2/7 (b) 5/7 (c) 1 (d) 0

Q.03 A die is thrown 200 times and odd numbers are obtained 53 times. Find the probability 0f getting an even number
(a) 47/200 (b) 53/200 (c) 147/200 (d) 153/200

Q.04 Find the value of x, if 2/3 is the probability of an event not happening and x/2 is the probability of the event is happening.
(a) 1/3 (b) 2/3 (c) 4/3 (d) 3/2

Q.05 Out of x girls and y boys, who participated in a debate competition, one of them was declared as a winner. What is the probability that the winner is a girl?
(a) y/ x+y (b) x/ x+y (c) x+y (d) 1

Level - 2

Q.06 Three unbiased coins are tossed together find the probability of getting
(i) All heads (ii) 2 heads (iii) 1 head (iv) At least 2 heads

Q.07 All king and queens are removed from the pack of 52 cards. Remaining cards are well shuffled and then a card is randomly drawn from it. Find the probability that this card is-
(i) A red face card (ii) A black card (iii) A queen

Q.08 A bag contains cards numbered from 10 to 100. A card is drawn at random from the bag. Find the probability that the
(i)Card bears a number which is a multiple of 3.
(ii) Cards bears a number which is less than or equal to 50.

Q.09 Two different dice are tossed together. Find the probability:
(i) of getting a double (ii) of getting a sum 10, of the numbers on the two dice.

Q.10 An integer is chosen at random between 1 and 100. Find the probability that it is:
(i) divisible by 8 (ii) not divisible by 8

Q.11 If a number x is chosen at random from the numbers -3, -2, -1, 0, 1, 2, 3 then find the probability of x^2 is less than 4.

Level - 3

Q.12 2 dice are thrown simultaneous. Find the probability of getting –
(i) An even no. as the sum (ii) The sum as a prime no. (iii) A total of at least 10
(iv) A double of even no. (v) A multiple of 2 on one die and a multiple of 3 on another die

Q.13 A jar contain 54 marbles. Each of which is blue, green and white. The probability of selecting a blue marble at random from the jar is 1/3 and the probability of selecting a green marble at random is 4/9. How many white marble does the jar contains?

Q.14 A die is roll twice. Find the probability that-
(i) 5 will not come up either time (ii) 5 will come up exactly one time

Q.15 A box contains 20 cards numbered from 1 to 20. A card is drawn at random from the box. Find the probability that the no. on the drawn card is-
(i) Divisible by 2 or 3 (ii) A prime no.

Q.16 Two customers Sita and Gita are visiting a particular shop in the same week. Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on-

(i) The same day? *(ii)* Consecutive day? *(iii)* Different days?

Q.17 Find the probability that a leap year selected at random will contain 53 Sundays.

Q.18 Two friends were born in the year 2000. What is the probability that they have same birthday?