Student Name: _____ Roll No: ___

Class 10th (Math)

Shat Pratishat Package

Session 2020-21

Based on Reduced Syllabus and Latest Pattern

Dear students this Math Shat Pratishat Package (Booklet) prepared according to Latest Syllabus (Reduced Syllabus) of Session 2020-21 by Punjab school Education Board. Those students who wants to get above 90% Marks in Mathematics of class 10th they must do all Booklet very well and those students who wants to get 58 Marks they must do preparation according to following Index (content).

Index to Get Above 90% Marks (72 to 80)

Index to Get 58 Marks

Class: 10th

Time: 3 Hours **Subject Math** **Theory Marks: 80**

Internal Assessment : 20

Question Paper Pattern **Total Marks: 100**

1. All Questions are Compulsory.
2. Section A: Questions No. 1 to 3 (32 Questions) Each carry 1 Marks.
   Question No. 1 (16 MCQ Questions).
   Question No. 2 (8 True/False Questions).
   Question No. 3 (8 Fill in Blanks Questions).
3. Section B: Questions No. 7 to 11 Each Question carry 2 Marks.
4. Section C: Questions No. 12 to 16 Each Question carry 4 Marks and internal Choices will be given in any three Questions.
5. Section D: Questions No. 17 to 18 Each Question carry 6 Marks and internal Choices will be given in all Questions.

Chapter	Chapter Name	1 Marks Ques.	2 Marks Ques.	4 Marks Ques.	6 Marks Ques.	Total Marks
1.	Real Numbers	1	1	-	-	3
2.	Polynomials	2	1	-	-	4
3.	Pair of Linear Equations in Two Variables	4	1	-	-	6
4.	Quadratic Equation	2	-	1	-	6
5.	Arithmetic Progressions	2	-	1	-	6
6 , 10.	Triangles, Circles	4	1	-	1	12
7.	Coordinate Geometry	3	1	-	-	5
8.	Introduction to Trigonometry	4	1	-	-	6
9.	Some Application of Trigonometry	-	-	1	-	4
11.	Constructions	-	-	1	-	4
12.	Area Related to Circles	2	1	-	-	4
13.	Surface Areas and Volumes	3	-	1	-	7
14.	Statistics	2	-	-	1	8
15.	Probability	3	1	-	-	5
Total		32	8	5	2	80

Class: 10th Subject: Math Some Important Formulae

Chapter: 1 (Real Numbers)

1. Product of two positive Integers = HCF × LCM of integers.
   (Or) Product of two positive Integers $a \times b$ = HCF (a, b) × LCM (a, b)
2. **Fundamental Theorem of Arithmetic:** Every composite number can be expressed (factorised) as a product of primes, and this factorization is unique, apart from the order in which the prime factors occur.
3. Let $x = \frac{p}{q}$ be a rational number, such that the prime factorization of q is of the form $2^n 5^m$, where n, m are non-negative integers. Then x has a decimal expansion which terminates.

Chapter: 2 (Polynomials)

1. if $p(x)$ is a polynomial in x, the highest power of x in $p(x)$ is called the degree of the polynomial $p(x)$.
2. A polynomial of degree 1 is called a linear polynomial.
3. A polynomial of degree n can have at most n zeroes.
4. The zeroes of a polynomial $p(x)$ are precisely the x-coordinates of the points, where the graph of $y = p(x)$ intersects the x-axis.
5. A Quadratic polynomial = x^2 − (Sum of zeroes) x + (Product of Zeroes)
6. If α and β are zeroes of quadratic polynomial $p(x) = ax^2 + bx + c$ then Sum of zeroes $(\alpha + \beta) = \frac{-b}{a}$, Product of Zeroes $(\alpha . \beta) = \frac{c}{a}$

Chapter: 3 (Pair of Linear Equations in Two Variables)

Determine the solutions of Pair of Linear Equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$

Sr. No.	Compare the Ratios	Algebraic Interpretation	Graphically Interpretation	Pair Consistent/Incosistent
1.	$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$	Exactly One Solution(Unique)	Intersecting Lines	Consistent
2.	$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$	Infinitely many solutions	Coincident Lines	Consistent
3.	$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$	No Solution	Parallel Lines	Inconsistent

Chapter: 4 (Quadratic Equations)

In Quadratic Equation: $ax^2 + bx + c = 0 \;\; ; a \neq 0$

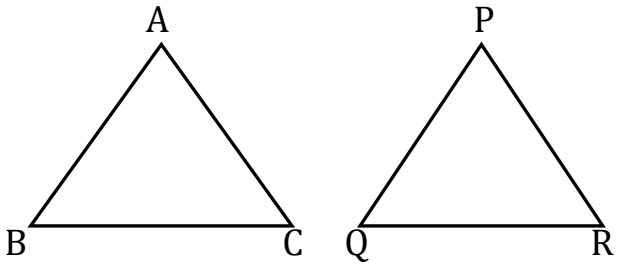
1. Discriminant $(D) = b^2 - 4ac$
2. Roots of Quadratic Equation $x = \frac{-b+\sqrt{D}}{2a}, x = \frac{-b-\sqrt{D}}{2a}$
3. Nature of roots of Quadratic Equation
   (a) If $D = b^2 - 4ac > 0$ then Two Distinct (Different) Real roots.
   (b) If $D = b^2 - 4ac = 0$ then Two Equal Real roots.
   (c) If $D = b^2 - 4ac < 0$ then No Real roots.

Chapter: 5 (Arithmetic Progressions)

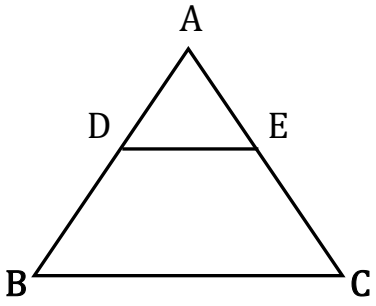
1. In Arithmetic Progression (AP):- To find nth term $a_n = a + (n-1)d$
   where $a = 1^{st}$ term , $d =$ Common difference
2. In Arithmetic Progression (AP):- Sum of n terms $S_n = \frac{n}{2}[2a + (n-1)d]$ Or
   $S_n = \frac{n}{2}[a + l]$ where $a = 1^{st}$ term , $d =$ Common difference $l =$ Last Term $= a_n$

Chapter: 6 (Triangles)

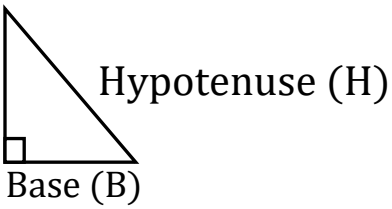
1. If $\Delta ABC \sim \Delta PQR$ then
   (i) $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$
   (ii) $\angle A = \angle P , \angle B = \angle Q , \angle C = \angle R$



2. If $\Delta ABC \sim \Delta PQR$ then $\frac{\text{area}(\Delta ABC)}{\text{area}(\Delta PQR)} = \left(\frac{AB}{PQ}\right)^2 = \left(\frac{BC}{QR}\right)^2 = \left(\frac{AC}{PR}\right)^2$
3. If ΔABC and DE || BC then
   $\frac{AD}{DB} = \frac{AE}{EC}$



4. **Pythagoras Theorem:** $(\text{Hypotenuse})^2 = (\text{Perpendicular})^2 + (\text{Base})^2$
   $(P)^2 + (B)^2 = (H)^2$

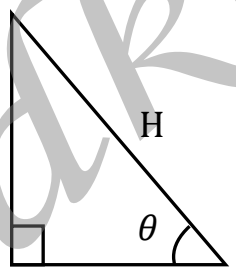


Chapter: 7 (Coordinate Geometry)

1. Distance between $P(x_1, y_1)$ and $Q(x_2, y_2)$ is $PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
2. Distance of Point $P(x, y)$ from origin $= \sqrt{x^2 + y^2}$
3. **Section Formula**: The coordinates of the point $P(x, y)$ which divides the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$ internally in the ratio $m:n$ are
   $P(x, y) = \left(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + my_1}{m+n}\right)$
4. Mid Point of the line segment joining the $P(x_1, y_1)$ and $Q(x_2, y_2)$ is $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.

Chapter: 8 (Introduction of Trigonometry)

1. $\sin\theta = \frac{P}{H}$
2. $\cos\theta = \frac{B}{H}$
3. $\tan\theta = \frac{P}{B} = \frac{\sin\theta}{\cos\theta}$
4. $\text{cosec}\,\theta = \frac{H}{P} = \frac{1}{\sin\theta}$
5. $\sec\theta = \frac{B}{P} = \frac{1}{\cos\theta}$
6. $\cot\theta = \frac{B}{P} = \frac{\cos\theta}{\sin\theta}$
7. $\sin^2 A + \cos^2 A = 1$
8. $\sec^2 A - \tan^2 A = 1 \quad ; 0° \le A < 90°$
9. $\text{cosec}^2 A - \cot^2 A = 1 \quad ; 0° < A < 90°$



$$(\mathbf{H})^2 = (\mathbf{P})^2 + (\mathbf{B})^2$$

For Remember

$\sin\theta$	$\cos\theta$	$\tan\theta$
Pandit (P)	Badri (B)	Parshad (P)
Har (H)	Har (H)	Bole (B)
Sona (S)	Chandi (C)	Tolhe (T)
$\text{cosec}\,\theta$	$\sec\theta$	$\cot\theta$

0° to 90° Trigonometry Angles

θ	0°	30°	45°	60°	90°
sin θ	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
cos θ	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
tan θ	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞

Chapter: 9 (Some Applications of Trigonometry)

1. $\tan\theta = \frac{P}{B}$ 2. $\tan 30° = \frac{1}{\sqrt{3}}$ 3. $\tan 60° = \sqrt{3}$ 4. $\tan 45° = 1$

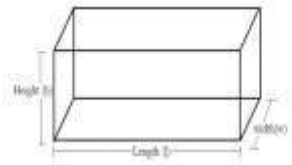
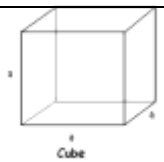
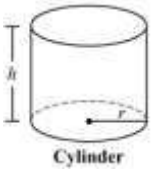
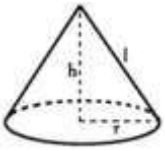
Chapter: 10 (Circles)

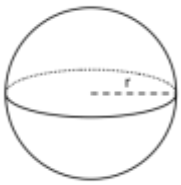
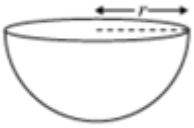
1. **Tangent:** A tangent to a circle is a line that intersects the circle at only one point.
2. **Point of Contact:** The common point of the tangent and the circle is called the point of contact.
3. The tangent at any point of a circle is perpendicular to the radius through the point of contact.
4. The lengths of tangents drawn from an external point to a circle are equal.

Chapter: 12 (Area Related to Circles)

1. Circumference of the Circle $= 2\pi r$
2. Area of the Circle $= \pi r^2$
3. Length of an arc of a sector $= \frac{\theta}{360} \times 2\pi r$
4. Area of the sector $= \frac{\theta}{360} \times \pi r^2$
5. Area of the Triangle $= \frac{1}{2} \times$ Base $\times$ Height
6. Area of the Equilateral Triangle $= \frac{\sqrt{3}}{4} \times a^2$, Each Side $= a$

Chapter: 13 (Surface Areas and Volumes)

Solids (Three Dimensional)	Volume	Lateral (Curved) Surface Area	Total Surface Area
Cuboid 	$l \times b \times h$	$2(bh + hl)$	$2(lb + bh + hl)$
Cube 	a^3	$4a^2$	$6a^2$
Cylinder 	$\pi r^2 h$	$2\pi rh$	$2\pi r(h + r)$ (or) $2\pi rh + 2\pi r^2$
Cone 	$\frac{1}{3}\pi r^2 h$	πrl	$\pi r(l + r)$ (or) $\pi rl + \pi r^2$

Solids (Three Dimensional)	Volume	Lateral (Curved) Surface Area	Total Surface Area
Sphere 	$\frac{4}{3}\pi r^3$	$4\pi r^2$	$4\pi r^2$
Hemisphere 	$\frac{2}{3}\pi r^3$	$2\pi r^2$	$3\pi r^2$

Chapter: 14 (Statistics)

1. Measures of central tendency:- Mean, Median, Mode
2. Mean $(\bar{X}) = \frac{\sum f_i X_i}{\sum f_i}$
3. Median $(M) = L + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$
4. Mode $(Z) = L + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$
5. Mode $= 3(\text{Median}) - 2(\text{Mean})$ Or $3(\text{Median}) = \text{Mode} + 2(\text{Mean})$

Chapter: 15 (Probability)

1. Probability of an Event:- $P(E) = \frac{\text{Number of outcomes favourable to E}}{\text{Number of all possible outcomes of the experiment}}$
2. The Probability of an event E is a number P(E) such that $0 \leq P(E) \leq 1$
3. The Probability of an event 'not E':- $P(\bar{E}) = 1 - P(E)$
4. $P(E) + P(\bar{E}) = 1$
5. An Event cannot happen called impossible Event. The Probability of impossible Event is 0.
6. An Event certain to happen called Sure Event. The Probability of Sure Event is 1.
7. The sum of the probabilities of all the elementary events of an experiment is 1.

Class: 10th Math One Marks Questions Total Marks: 32

Section-A: This Section contains 32 Questions and Each Question Carry one Marks.

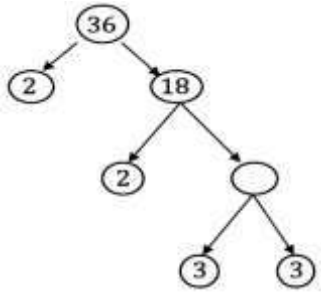
Question No. 1 Part (i) to (xvi) Contain 16 Multiple Choice Questions (MCQ).

Question No. 2 Part (i) to (viii) Contain 8 True/False Questions.

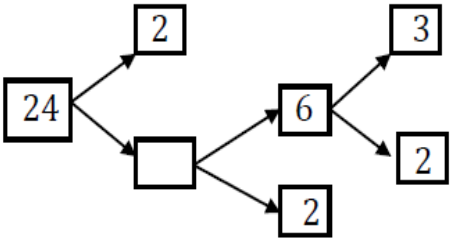
Question No. 3 Part (i) to (viii) Contain 8 Fill in the Blanks Questions.

Chapter: 1 (Real Numbers) Marks: 01

1. $\sqrt{3}$ is an Irrational number. (True/False)



2. What will be the Missing number in Prime Factorization tree.
   (a) 3 (b) 2 (c) 6 (d) 9
3. What is the decimal expansion of $\frac{17}{8}$
   (a) Terminating (b) Non-terminating Repeating
   (c) Prime (d) Co-prime
4. Product of two positive Integers $a \times b$ = HCF (a, b) × LCM (a, b) (True/False)
5. Find the Missing number in Prime Factorization tree.
   (a) 2 (b) 12 (c) 6 (d) 3

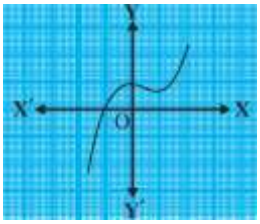


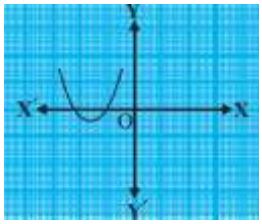
6. $\frac{13}{3125}$ is terminating decimal expansion. (True/False)
7. Which following number is rational number.
   (a) $\sqrt{2}$ (b) $\sqrt{3}$ (c) $\sqrt{4}$ (d) $\sqrt{5}$
8. Every composite number can be expressed as a product of primes. (True/False)
9. For any positive integers a and b, there exist unique integers q and r Satisfying $a = bq + r$,$0 \leq r < b$ (True/False)
10. Let $x = \frac{p}{q}$ be a rational number, such that the prime factorization of q is of the form $2^n 5^m$, where n, m are non-negative integers. Then x has a decimal expansion which terminates. (True/False)
11. A Prime number has _____ factors.
    (a) Two (b) Three (c) Four (d) One
12. If HCF of two positive Integers is 1 then Integers are _____.
    (a) Irrational (b) Composite (c) Prime (d) Co-prime
13. 0.120120012000120000..... is _____ number.
    (a) Irrational (b) Rational (c) Whole (d) Integer

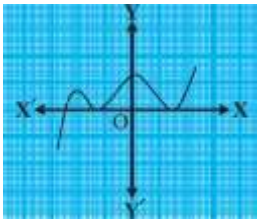
Chapter: 2 (Polynomials) Marks: 02

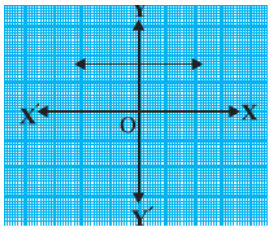
14. A Quadratic polynomial has at most _____ zeroes .
    (a) 0 (b) 1 (c) 2 (d) 3
15. A polynomial of degree 1 is called _____ polynomial.
    (a) Quadratic (b) Linear (c) Cubic (d) None of these

16. The graphs of $y = p(x)$ are given in Figure, for some polynomials $p(x)$. Find the number of zeroes of $p(x)$, in each case.


(i)


(ii)


(iii)


(iv)

(a) 1 (b) 0 (c) 2 (d) 3

17. A Cubic polynomial has at most two zeroes. (True/False)

18. Find the number of zeroes of the polynomial $p(x) = x^2 - 3$.
(a) 0 (b) 1 (c) 2 (d) 3

19. If the graph of $y = p(x)$ don`t intersects the x-axis at any point then number of zeroes of a polynomial $p(x)$ is zero. (True/False)

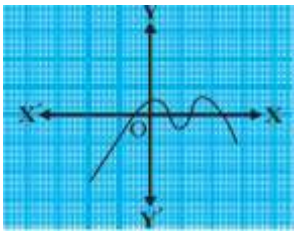
20. Sum of the zeroes _____ of a Quadratic polynomial $p(x) = ax^2 + bx + c$.
(a) $\frac{a}{b}$ (b) $\frac{b}{a}$ (c) $\frac{-a}{b}$ (d) $\frac{-b}{a}$

21. Product of the zeroes _____ of a Quadratic polynomial $p(x) = ax^2 + bx + c$.
(a) $\frac{-b}{a}$ (b) $\frac{c}{a}$ (c) $\frac{-c}{a}$ (d) $\frac{b}{a}$

22. Find the Sum and Product of the zeroes of a polynomial $p(x) = x^2 + 7x + 10$.
(a) 7, 10 (b) 10, 7 (c) -7, 10 (d) -7, -10

23. Find the Sum of the zeroes of a polynomial $p(x) = x^2 + 1$
(a) 2 (b) 0 (c) 1 (d) 3

24. Find the number of zeroes of the polynomial in given Figure.
(a) 4 (b) 0 (c) 1 (d) 3



Chapter: 3 (Pair of Linear Equations in Two Variables) Marks: 04

25. If graph of pair of linear equations intersect at one point then system of pair of linear Equations is _____
(a) Coincide (b) Consistent (c) Inconsistent (d) None of these.

26. If pair of linear equations has Unique solution or many solutions then system of pair of linear Equations is consistent. (True/False)

27. If pair of linear equations has no solution then graph of these lines are _____
(a) Intersect at one point (b) Coincide (c) Parallel (d) Consistent

28. If graph of pair of linear equations intersect at one point then the solution of pair of linear Equations are
(a) One Solution (b) No Solution (c) Many Solution (d) None of these.

29. If graph of pair of linear equations is parallel then pair of linear Equations have no solution. (True/False)

30. If graph of pair of linear equations is Coincide then pair of linear Equations have unique solution. (True/False)

31. The graph of pair of linear equations $2x + 3y = 9$ and $4x + 6y = 18$ is

(a) Lines Intersect at one point (b) Lines Parallel

(c) Lines Coincide (d) None of these

32. If pair of linear equations $kx - y = 2$ and $6x - 2y = 3$ have unique solution then find the value of k.

(a) $k = 3$ (b) $k \neq 3$ (c) $k = \frac{1}{3}$ (d) $k \neq \frac{1}{3}$

33. If $(6, k)$ is solution of linear equation $3x + y = 22$ then find the value of k.

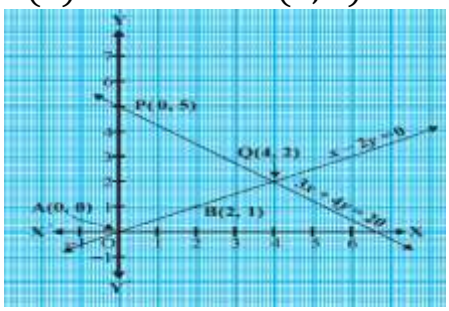
(a) 4 (b) -4 (c) 3 (d) -3

34. The graph of the Equation of $y = -3$ is parallel to x −axis. (True/False)

35. The graph of pair of linear equations $x = a$ and $y = b$ is

(a) Parallel (b) Coincide (c) Intersect at (a, b) (d) Intersect at (b, a)

36. From the figure find the solution of $x - 2y = 0$ and $3x + 4y = 20$.



(a) $(0, 5)$ (b) $(0,0)$ (c) $(2,1)$ (d) $(4,2)$

37. The graph of pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ is parallel if

(a) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ (b) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (c) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ (d) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

38. If graph of pair of linear equations is parallel then solutions of linear Equation.

(a) One Solution (b) Two Solution (c) Many Solution (d) No Solution

Chapter: 4 (Quadratic Equations) Marks: 02

39. Which following equation is not a Quadratic Equation.

(a) $x - \frac{3}{x} = 4$ (b) $3x - \frac{5}{x} = x^2$ (c) $x + \frac{1}{x} = 4$ (d) $x^2 - 3 = 4x^2 - 4x$

40. $x(2x + 3) = x^2 + 1$ is a Quadratic Equation. (True/False)

41. Equation $x^2 + 3x + 1 = (x - 2)^2$ is a Quadratic Equation. (True/False)

42. If Quadratic Equation $ax^2 + bx + c = 0$ has distinct real roots then

(a) $D = 0$ (b) $D > 0$ (c) $D < 0$ (d) $D \geq 0$

43. If Quadratic Equation $ax^2 + bx + c = 0$ has Equal real roots then $D = 0$ (True/False)

44. If Quadratic Equation $ax^2 + bx + c = 0$ has no real roots then

(a) $D > 0$ (b) $D = 0$ (c) $D \leq 0$ (d) $D < 0$

45. $(x - 2)(x + 1) = (x - 1)(x + 3)$ is a Quadratic Equation. (True/False)

Chapter: 5 (Arithmetic Progressions) Marks: 02

46. What is the common difference of AP $3, 1, -1, -3$ .....

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

47. What is the nth term of an Arithmetic Progression (AP).

(a) $2a + (n-1)d$ (b) $a + (n-1)d$ (c) $\frac{n}{2}[2a + (n-1)d]$ (d) $\frac{n}{2}[a + l]$

48. Is 2, 4, 8, 16, ... an Arithmetic Progression (AP). (True/False)

49. Sum of the nth terms of an Arithmetic Progression (AP) is $\frac{n}{2}[a + l]$. (True/False)

50. Common difference (d) of an AP $-10, -6, -2, 2$ ..... is 4. (True/False)

51. Is 3, 3, 3, 3, ... an Arithmetic Progression (AP). (True/False)

52. Common difference (d) of an AP $-5, -1, 3, 7$ ..... is _____

(a) 4 (b) -4 (c) -5 (d) -6

53. If $a = 4$ and $d = -3$ then find the Arithmetic Progression (AP).

(a) $4, 7, 10, 13$ .... (b) $4, 1, -2, -5$ ... ... (c) $4, 3, 2, 1$ ... ... (d) $4, -3, 7, -4$ ... ...

54. If nth term of an (AP) is $a_n = 3 + 4n$ then 10^{th} term of AP is 40. (True/False)

55. Fill in the Blanks of AP 18, 13, ___ , 3

(a) 15 (b) 10 (c) 5 (d) 8

56. What is the first term and common difference of AP 47, 41, 35, 29, ...

(a) 47, 6 (b) 47, -6 (c) 47, -5 (d) 47, 5

Chapter: 6 (Triangles) Marks: 02

57. All Circles are _____

(a) Congruent (b) Similar (c) Equal (d) None of these.

58. All Circles are Similar. (True/False)

59. All_____ triangles are similar.

(a) Equilateral (b) Isosceles (c) Right angle (d) Scalene

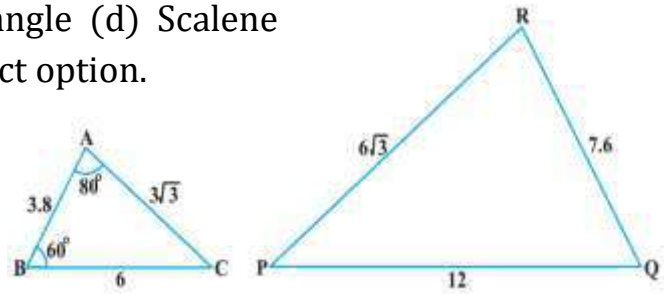
60. Analysis the figure (i) and Chose the correct option.

(a) $\Delta ABC \sim \Delta PQR$ (b) $\Delta ABC \sim \Delta QPR$

(c) $\Delta ABC \sim \Delta RQP$ (d) $\Delta ABC \sim \Delta QRP$

61. From the figure (i) Find the angle $\angle P$.

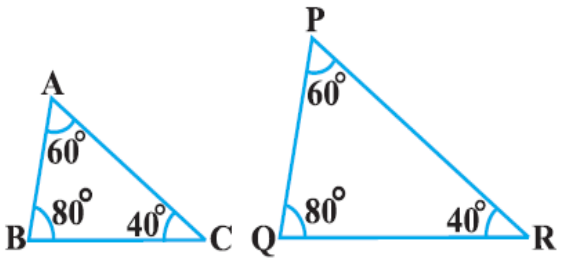
(a) 80° (b) 60° (c) 90° (d) 40°



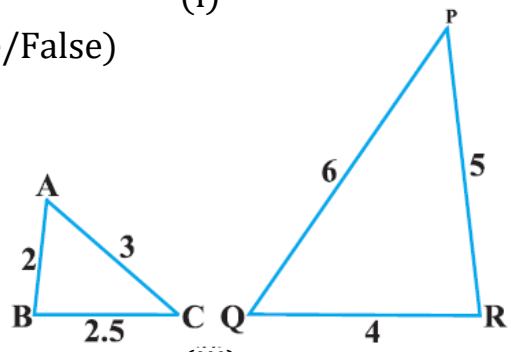
(i)

62. In the figure (ii) $\Delta ABC \sim \Delta PQR$ (True/False)

63. From the figure (iii) triangles are similar. (True/False)



(ii)



(iii)

64. Sides of two similar triangles are in the ratio 4: 9 Find the ratio of area of these triangles.

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

Chapter: 7 (Coordinate Geometry) Marks: 03

65. Distance between two points $P(x_1, y_1)$ and $Q(x_2, y_2)$ is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ (True/False)

66. Distance of the point $P(x, y)$ from origin is _____

(a) $x^2 + y^2$ (b) $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ (c) $\sqrt{x^2 + y^2}$ (d) $\sqrt{x^2 - y^2}$

67. The Coordinates of the origin is $(0, 0)$. (True/False)

68. Mid point of the line segment $A(x_1, y_1)$ and $B(x_2, y_2)$ is

(a) $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ (b) $(x_1 + x_2, y_1 + y_2)$ (c) $\left(\frac{x_1 - x_2}{2}, \frac{y_1 + y_2}{2}\right)$ (d) (x, y)

69. The distance of a point from the x −axis is _____

(a) Origin (b) Abscissa (c) Ordinate (d) Coordinates

70. Abscissa of the point $(3, -4)$ is _____

(a) 3 (b) −4 (c) −3 (d) 4

71. The distance of a point from the y −axis is _____

(a) Origin (b) Abscissa (c) Ordinate (d) Coordinates

72. The coordinates of a point on the x −axis is _____

(a) $(x, 0)$ (b) $(0, 0)$ (c) $(0, x)$ (d) $(0, y)$

73. Which point is on the y −axis.

(a) $(a, 0)$ (b) $(y, 0)$ (c) $(0, a)$ (d) $(a, -a)$

74. The distance of the point $P(3, 4)$ from origin is 5. (True/False)

75. The distance of the point $A(2, 3)$ from x −axis is _____

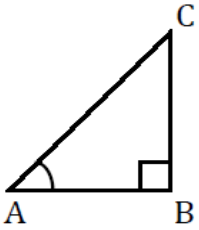
(a) 2 (b) 3 (c) 5 (d) 1

76. The distance of the point $A(4, 1)$ from y −axis is _____

(a) 4 (b) 1 (c) 5 (d) 3

Chapter: 8 (Introduction of Trigonometry) Marks: 04

77. In the given ΔABC find the value of sin A.



(a) $\frac{AB}{AC}$ (b) $\frac{AB}{BC}$ (c) $\frac{BC}{AC}$ (d) $\frac{BC}{AB}$

78. In the given ΔABC find the value of cos A.

(a) $\frac{AB}{AC}$ (b) $\frac{AB}{BC}$ (c) $\frac{BC}{AC}$ (d) $\frac{BC}{AB}$

79. The value of tan A is always less than 1. (True/False)

80. The value of $\sin\theta = \frac{4}{3}$ for some angle θ. (True/False)

81. The value of $\sec A = \frac{12}{5}$ for some angle A. (True/False)

82. $\sin\theta = \cos\theta$ for all values of θ. (True/False)

83. The value of $\sin 30° =$ _____ (a) 0 (b) 2 (c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$

84. The value of $\sin\theta$ increases as θ as increases. (True/False)

85. The value of $\cos\theta$ increases as θ as increases. (True/False)

86. $\sin(A + B) = \sin A + \sin B$. (True/False)

87. $9\sec^2 A - 9\tan^2 A$ equals to (a) 1 (b) 0 (c) 9 (d) -9

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

89. $\sec^2 A - \tan^2 A =$ _____ where $0° \leq A < 90°$

(a) 1 (b) 0 (c) -1 (d) None of these.

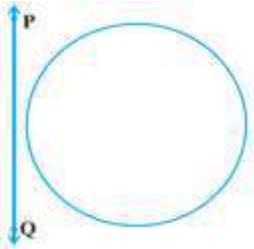
90. $1 + \cot^2 A =$ _____ where $0° < A \leq 90°$

(a) $\sin^2 A$ (b) $\cos^2 A$ (c) $\sec^2 A$ (d) $\text{cosec}^2 A$

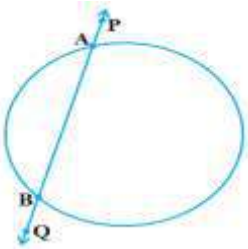
91. cot A is product of cot and A. (True/False)

Chapter: 10 (Circles) Marks: 02

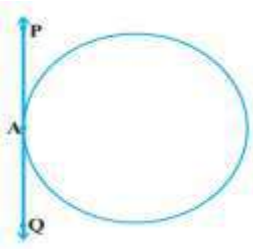
92. Which figure is representing the tangent of the circle from following figures?



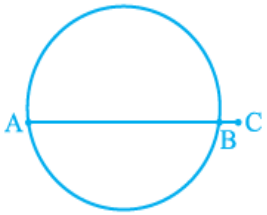
(a)



(b)



(c)



(d)

93. How many tangents can a circle have?

(a) 1 (b) 2 (c) 3 (d) Infinitely Many

94. A tangent to a circle intersects it in _____ Points.

(a) One (b) Two (c) at no point (d) Infinitely Many

95. A circle can have _____ parallel tangents at the most.

(a) One (b) Two (c) Three (d) Infinitely Many

96. A line intersecting a circle in two points is called a _____

(a) Tangent (b) Diameter (c) secant (d) Radius

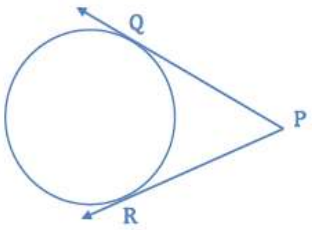
97. The tangent at any point of a circle is perpendicular to the radius through the point of contact. (True/False)

98. The common point of a tangent to a circle and the circle is called _____

(a) Centre (b) Chord (c) External Point (d) Point of Contact

99. In the given figure PQ= 6 cm then find the length of PR.

(a) 6 cm (b) 12 cm (c) 3 cm (d) None of these.



100. The lengths of tangents drawn from an external point to a circle are equal. (True/False)

101. There is Two tangents to any circle passing through a point lying inside the circle. (True/False)

Chapter: 12 (Area Related to Circles) Marks: 02

102. Area of the sector of angle θ = _____

(a) $\frac{2\pi r\theta}{180}$ (b) $\frac{2\pi r\theta}{360}$ (c) $\frac{\pi r^2\theta}{360}$ (d) $\frac{\pi r^2\theta}{180}$

103. Length of an arc of a sector of angle θ = _____

(a) $\frac{\theta}{360} \times \pi r^2$ (b) $\frac{\theta}{360} \times 2\pi r$ (c) $\frac{\theta}{720} \times \pi r^2$ (d) $\frac{\theta}{720} \times 2\pi r$

104. Area of a sector of angle P° of a circle with radius R is

(a) $\frac{\mathrm{P}}{180} \times 2\pi\mathrm{R}$ (b) $\frac{\mathrm{P}}{360} \times 2\pi\mathrm{R}$ (c) $\frac{\mathrm{P}}{180} \times \pi r^2$ (d) $\frac{\mathrm{P}}{720} \times 2\pi r^2$

105. If the perimeter and the area of a circle are numerically equal, then radius of the circle is

(a) 2 units (b) π units (c) 4 units (d) 7 units

106. Area of the Quarter circle is = _____

(a) πr (b) $\frac{\pi r}{2}$ (c) $\frac{\pi r^2}{2}$ (d) $\frac{\pi r^2}{4}$

107. Area of the circle is $\pi\ cm^2$ with the radius 1 cm. (True/False)

108. Circumference of the circle is $2\pi\ cm$ with the radius 1 cm. (True/False)

109. Circumference of the circle is $2\pi r^2$ with the radius r. (True/False)

110. The Longest chord of the circle is a diameter of the circle. (True/False)

Chapter: 13 (Surface Areas and Volumes) Marks: 03

111. In the given figure made up of combination of _____ and _____ solids

(a) Cone and Sphere (b) Cone and Hemisphere

(c) Cylinder and Sphere (d) Cylinder and Hemisphere

112. Which solid will make combination of two cubes with edge 8 cm.

(a) Cuboid (b) Cube (c) Cylinder (d) Square

113. Volume of cylinder with radius r and height h = _____

(a) $2\pi rh$ (b) $\frac{1}{3}\pi r^2 h$ (c) $\pi r^2 h$ (d) $\pi r^3 h$

114. Volume of cone with radius r and height h = _____

(a) $\frac{4}{3}\pi r^2 h$ (b) $\frac{1}{3}\pi r^2 h$ (c) $\pi r^2 h$ (d) $\pi r^3 h$

115. If Radius of the base and height of the cone and cylinder is equal then ratio of their volumes is 3:1 (True/False)

116. Curved surface area of Hemisphere with radius r = _____

(a) πr^2 (b) $2\pi r^2$ (c) $3\pi r^2$ (d) $4\pi r^2$

117. Find the ratio of total surface area of sphere and volume of the Sphere.

(a) $3:r$ (b) $2:r$ (c) $4:3$ (d) $1:3r$

118. Curved surface area of cone is $2\pi rh$. (True/False)

119. Volume of cube is $216\ cm^3$ with edge 6 cm. (True/False)

Chapter: 14 (Statistics) Marks: 02

120. The wickets taken by a bowler in 10 cricket matches are as follows:

2, 6 , 4 , 5 , 0 , 2 , 1 , 3 , 2 , 3 Find the Mode of the data.

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

121. Which is not the Measures of central tendency.
(a) Mean (b) Median (c) Mode (d) Range.

122. Mode + 2 (Mean) = _____
(a) Median (b) 3 (Median) (c) 2 (Median) (d) 3 (Mode)

123. If Mean denotes $\bar{X}$, Median denotes M and Mode denotes Z then which one is correct.
(a) $\bar{X} = 2Z - 3M$ (b) $M = 2\bar{X} - 3Z$ (c) $Z = 2\bar{X} - 3M$ (d) $Z = 3M - 2\bar{X}$

124. Find the Class Mark of the Class Interval 10-25 of grouped data.
(a) 10 (b) 15 (c) 17.5 (d) 25

125. Find the Size of the Class Interval 20-30 of grouped data.
(a) 5 (b) 10 (c) 15 (d) 20

126. Formula to find the mean of grouped data is $\frac{\sum f_i X_i}{\sum f_i}$ (True/False)

127. Formula to find the median of grouped data is
(a) $\frac{\sum f_i X_i}{\sum f_i}$ (b) $L + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$ (c) $L + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$ (d) None of these

128. Formula to find the mode of grouped data is
(a) $\frac{\sum f_i X_i}{\sum f_i}$ (b) $L + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$ (c) $L + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$ (d) None of these

Chapter: 15 (Probability) Marks: 03

129. If P(E)=0.05 , what is the probability of 'not E' ?
(a) 0.95 (b) 0.095 (c) 95 (d) 0.0095

130. The probability of sure event is 0. (True/False)

131. The probability of an Event E + probability of the Event 'not E' = _____
(a) 0 (b) 1 (c) 2 (d) None of these

132. The probability of an impossible event is
(a) 1 (b) 0 to 1 (c) 0 (d) $\frac{1}{2}$

133. The sum of the probabilities of all the elementary events of an experiment is 1. (True/False)

134. The probability of an event is greater than or equal to _____ and less than or equal to _____
(a) 0, 1 (b) 1, 0 (c) 1, 2 (d) 0, $\frac{1}{2}$

135. A box contains 3 blue, 2 white 4 red marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be black colour.
(a) $\frac{2}{9}$ (b) $\frac{4}{9}$ (c) 0 (d) 1

136. Which of the following cannot be the probability of an event?
(a) $\frac{2}{3}$ (b) -1.5 (c) 15% (d) 0.7

137. If P $(\bar{E})$ stands for the probability of Event 'not E' then P(E) + P $(\bar{E})$ = _____

(a) 0 (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) 1

138. The probability of getting a head is $\frac{1}{2}$ when a coin tossed once. (True/False)

139. Find the probability of getting even number when throw a dice once.

(a) $\frac{2}{3}$ (b) $\frac{1}{6}$ (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

140. A dice throw once. The probability of getting prime number is _____

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{1}{6}$

Answer Key

1. True **2.** (d) 9 **3.** (a) Terminating **4.** True **5.** (b) 12 **6.** True

7. (c) $\sqrt{4} = 2$ **8.** True **9.** True **10.** True **11.** (a) Two

12. (d) Co-prime **13.** (a) Irrational

14. (c) 2 **15.** (b) Linear **16.** **(i)** (a) 1 **(ii)** (c) 2 **(iii)** (d) 3 **(iv)** (b) 0

17. False **18.** (c) 2 **19.** True **20.** (d) $\frac{-b}{a}$ **21.** (b) $\frac{c}{a}$ **22.** (c) $-7, 10$

23. (b) 0 **24.** (a) 4 **25.** (b) Consistent **26.** True **27.** (c) Parallel

28. (a) One Solution **29.** True **30.** False **31.** (c) Lines Coincide

32. (b) $k \neq 3$ **33.** (a) 4 **34.** True **35.** (c) Intersect at point (a, b)

36. (d) (4,2) **37.** (b) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ **38.** (d) No Solution

39. (b) $3x - \frac{5}{x} = x^2$ **40.** True **41.** False **42.** (b) D > 0 **43.** True

44. (d) D < 0 **45.** False **46.** (c) -2 **47.** (b) $a + (n-1)d$ **48.** False

49. True **50.** True **51.** True **52.** (a) 4 **53.** (b) $4, 1, -2, -5 \ldots\ldots$

54. False **55.** (d) 8 **56.** (b) $47, -6$

57. (b) Similar **58.** True **59.** (a) Equilateral **60.** (c) $\Delta ABC \sim \Delta RQP$

61. (d) 40° **62.** True **63.** True **64.** (d) 16:81 **65.** True **66.** (c) $\sqrt{x^2 + y^2}$

67. True **68.** (a) $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ **69.** (c) Ordinate **70.** (a) 3 **71.** (b) Abscissa

72. (a) $(x, 0)$ **73.** (c) $(0, a)$ **74.** True **75.** (b) 3 **76.** (a) 4

77. (c) $\frac{BC}{AC}$ **78.** (a) $\frac{AB}{AC}$ **79.** False **80.** False **81.** True **82.** False

83. (c) $\frac{1}{2}$ **84.** True **85.** False **86.** False **87.** (c) 9 **88.** (b) $\cos^2 A$

89. (a) 1 **90.** (d) $\text{cosec}^2 A$ **91.** False

92. (c) **93.** (d) Infinitely Many **94.** (a) One **95.** (b) Two **96.** (c) Secant

97. True **98.** (d) Point of contact **99.** (a) 6 cm **100.** True **101.** False

102. (c) $\frac{\pi r^2\theta}{360}$ **103.** (b) $\frac{\theta}{360} \times 2\pi r$ **104.** (d) $\frac{\mathrm{P}}{720} \times 2\pi r^2$ **105.** (a) 2 units

106. (d) $\frac{\pi r^2}{4}$ **107.** True **108.** True **109.** False **110.** True

111. (b) Cone and Hemisphere **112.** (a) Cuboid **113.** (c) $\pi r^2 h$ **114.** (b) $\frac{1}{3}\pi r^2 h$

115. False **116.** (b) $2\pi r^2$ **117.** (a) $3{:}r$ **118.** False **119.** True

120. (c) 2 **121.** (d) Range **122.** (b) 3 (Median) **123.** (d) $\mathrm{Z} = 3\mathrm{M} - 2\overline{\mathrm{X}}$

124. (c) 17.5 **125.** (b) 10 **126.** True **127.** (c) $\mathrm{L} + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$

128. (b) $\mathrm{L} + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$

129. (a) 0.95 **130.** False **131.** (b) 1 **132.** (c) 0 **133.** True **134.** (a) $0, 1$

135. (c) 0 **136.** (b) -1.5 **137.** (d) 1 **138.** True **139.** (c) $\frac{1}{2}$ **140.** (b) $\frac{1}{2}$

Class: 10th Math Two Marks Questions Total Marks: 16

Section-C: This Section contains 8 Questions and Each Question Carry two Marks. One Question will come from each following chapters.

Chapter: 1 (Real Numbers)

1. Express following numbers as a product of its prime factors:
   (i) 140 (ii) 156 (iii) 5005 (iv) 3825
2. Find the LCM and HCF of the following integers by applying the prime factorization method.
   (i) 96 and 404 (ii) 12, 15 and 21 (iii) 6, 72 and 120
3. If HCF (306 , 657) = 9, find LCM (306 , 657).
4. Without actually performing the long division, state whether the following rationalNumbers will have a terminating decimal expansion or a non-terminating repeating decimal expansion. Write down the decimal expansions of terminating decimal expansions.
   (i) $\frac{13}{3125}$ (ii) $\frac{17}{8}$ (iii) $\frac{15}{1600}$ (iv) $\frac{6}{15}$ (v) $\frac{64}{455}$

Chapter: 2 (Polynomials)

5. Find a quadratic polynomial each with the given numbers as the sum and product of its zeroes respectively.
   (i) 4 and 1 (ii) -3 and 2 (iii) $\frac{1}{4}$ and -1 (iv) 1 and 1
6. Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients.
   (i) $x^2 - 2x - 8$ (ii) $4s^2 - 4s + 1$ (iii) $x^2 + 7x + 10$ (iv) $3x^2 - x - 4$

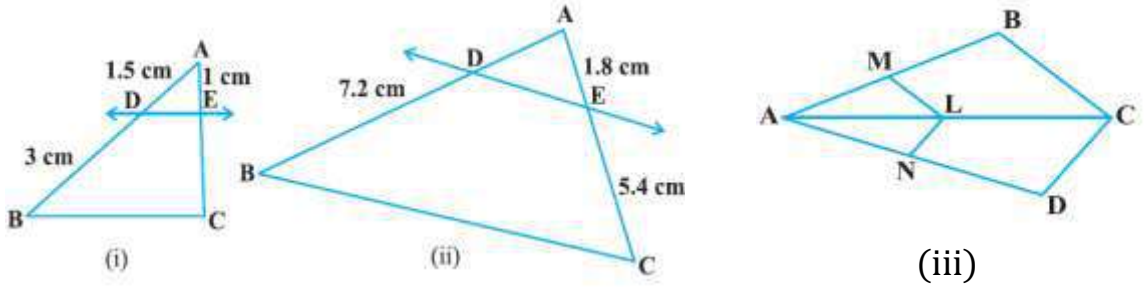
Chapter: 3 (Pair of Linear Equations in Two Variables)

7. The coach of a cricket team buys 3 bats and 6 balls for ₹ 3900. Later, she buys another bat and 3 more balls of the same kind for ₹ 1300. Represent this situation algebraically and geometrically.
8. The cost of 2 kg of apples and 1kg of grapes on a day was found to be ₹ 160. After a month, the cost of 4 kg of apples and 2 kg of grapes is ₹ 300. Represent the situation algebraically and geometrically.
9. On comparing the ratios $\frac{a_1}{a_2}, \frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the following pair of linear equations are consistent, or inconsistent.
   (i) $3x + 2y = 5 , 2x - 3y = 7$ (ii) $2x - 3y = 8 , 4x - 6y = 9$
   (iii) $5x - 3y = 11 , -10x + 6y = -22$ (iv) $\frac{4}{3}x + 2y = 8 , 2x + 3y = 12$

10. On comparing the ratios $\frac{a_1}{a_2}, \frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersect at a point, are parallel or coincident.
(i) $5x - 4y + 8 = 0$, $7x + 6y - 9 = 0$ (ii) $9x + 3y + 12 = 0$, $18x + 6y + 24 = 0$
(iii) $6x - 3y + 10 = 0$, $2x - y + 9 = 0$
11. For which values of p does the pair of equations $4x + py + 8 = 0, 2x + 2y + 2 = 0$ has unique solution?
12. For what values of k will the pair of linear equations $kx + 3y - (k - 3) = 0$, $12x + ky - k = 0$ have infinitely many solutions?
13. For which value of k will the pair of linear equations $3x + y = 1$, $(2k - 1)x + (k - 1)y = 2k + 1$ have no solution?
14. Solve following pairs of linear equations?
(i) $x + y = 14$, $x - y = 4$ (ii) $2x + y - 6 = 0$, $4x - 2y - 4 = 0$
(iii) $3x + 4y = 10$, $2x - 2y = 2$ (iv) $2x + y = 5$, $3x + 2y = 8$
(v) $x - 3y - 7 = 0$, $3x - 3y - 15 = 0$ (vi) $x + 3y = 5$, $2x - 3y = 12$
(vii) $x - 2y = 0$, $3x + 4y = 20$ (viii) $x + 3y = 6$, $2x - 3y = 12$

Chapter: 6, 10 (Triangles, Circles)

15. If In Given Figure (i) DE||BC then Find EC.
16. If In Given Figure (ii) DE||BC then Find AD.
17. If In Given Figure (iii) LM||CB and LN||CD then prove that $\frac{AM}{AB} = \frac{AN}{AD}$



18. Let $\triangle ABC \sim \triangle DEF$ and their areas be, respectively, 64 cm^2 and 1121 cm^2. If $EF = 15.4$ cm, find BC.
19. $\triangle ABC$ is an isosceles triangle right angled at C. Prove that $(AB)^2 = 2(AC)^2$.
20. A ladder 10 m long reaches a window 8 m above the ground. Find the distance of the foot of the ladder from base of the wall.
21. A ladder is placed against a wall such that its foot is at a distance of 2.5 m from the wall and its top reaches a window 6 m above the ground. Find the length of the ladder.
22. A guy wire attached to a vertical pole of height 18 m is 24 m long and has a stake attached to the other end. How far from the base of the pole should the stake be driven so that the wire will be taut?
23. Two poles of heights 6 m and 11 m stand on a plane ground. If the distance between the feet of the poles is 12 m, find the distance between their tops.

24. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Find the of Length PQ.

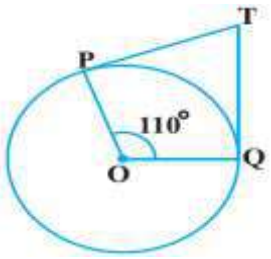
25. From a point Q, the length of the tangent to a circle is 24 cm and the distance of Q from the centre is 25 cm. Find the radius of the circle.

26. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.

27. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

28. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of 80°, then find ∠POA.

29. In Figure, if TP and TQ are the two tangents to a circle with centre O so that ∠POQ = 110°, Then find ∠PTQ.



Chapter: 7 (Coordinate Geometry)

30. Find the distance between the following pairs of points.
(i) $(2, 3), (4, 1)$ (ii) $(-5, 7), (-1, 3)$

31. (i) Find the point on the x −axis which is equidistant from $(2, -5)$ and $(-2, 9)$.
(ii) Find a point on the y −axis which is equidistant from the points $A(6, 5)$ and $B(-4, 3)$.

32. Find the coordinates of the point which divides the line segment joining the points $(4, -3)$ and $(8, 5)$ in the ratio 3: 1 internally.

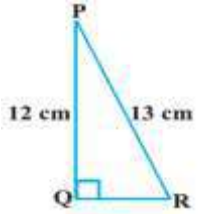
33. In what ratio does the point $(-4, 6)$ divide the line segment joining the points $A(-6, 10)$ and $B(3, -8)$?

34. (i) Find the ratio in which the line segment joining $A(1, -5)$ and $B(-4, 5)$ is divided by the x −axis. Also find the coordinates of the point of division.
(ii) Find the ratio in which the y −axis divides the line segment joining the points $(5, -6)$ and $(-1, -4)$. Also find the point of intersection.

35. (i) If the points $A(6, 1)$, $B(8, 2)$, $C(9, 4)$ and $D(p, 3)$ are the vertices of a parallelogram, taken in order, find the value of p.
(ii) If $(1, 2)$, $(4, y)$, $(x, 6)$ and $(3, 5)$ are the vertices of a parallelogram taken in order, find x and y.

Chapter: 8 (Introduction of Trigonometry)

36. In Figure, Find $\tan P - \cot R$.



37. In △ ABC right-angled at B, AB = 24 cm, BC = 7 cm. Determine
(i) $\sin A$ (ii) $\cos A$ (iii) $\sin C$ (iv) $\cos C$

38. (i) Given $\tan A = \frac{4}{3}$, find the other trigonometric ratios of the angle A.
(ii) Given $\sec \theta = \frac{13}{12}$, find the other trigonometric ratios.
(iii) Given $15 \cot A = 8$, find $\sin A$ and $\sec A$.
(iv) Given $\sin A = \frac{3}{4}$ Calculate $\cos A$ and $\tan A$.

39. Consider $\triangle ACB$, right-angled at C, in which AB = 29 units, BC = 21 units and $\angle ABC = \theta$ Determine the values of $\sin^2\theta + \cos^2\theta$

40. Find the value of $\sin 60° \cos 30° + \sin 30° \cos 60°$.

41. Prove that (i) $\sec A\,(1 - \sin A)(\sec A + \tan A) = 1$ (ii) $\frac{1+\sec A}{\sec A} = \frac{\sin^2 A}{1-\cos A}$

42. Prove that (i) $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$ (ii) $\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2\sec A$

Chapter: 12 (Area Related to Circles)

43. The radii of two circles are 19 cm and 9 cm respectively. Find the radius of the circle which has circumference equal to the sum of the circumferences of the two circles.

44. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.

45. If the perimeter and the area of a circle are numerically equal, then find the radius of the circle.

46. (i) Find the area of the sector of a circle with radius 4 cm and of angle 30°.
(ii) Find the area of a sector of a circle with radius 6 cm if angle of the sector is 60°.

47. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

48. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the length of arc and area of the sector formed by the arc.

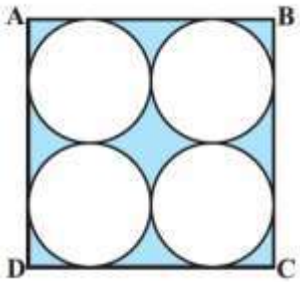
49. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope (see Figure). Find the area of that part of the field in which the horse can graze.

50. In Figure (i) Find the area of the shaded region where ABCD is a square of side 14 cm.

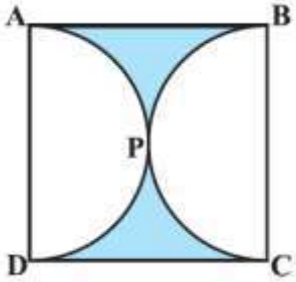
51. In Figure (ii), Find the area of the shaded region if ABCD is a square of side 14 cm and APD and BPC are semicircles.

52. In Figure (iii) From each corner of a square of side 4 cm a quadrant of a circle of radius 1 cm is cut and also a circle of diameter 2 cm is cut. Find the area of the remaining portion of the square.

53. In Figure (iv) ABCD is a square of side 14 cm. With centres A, B, C and D, four circles are drawn such that each circle touch externally two of the remaining three circles. Find the area of the shaded region.



(i)



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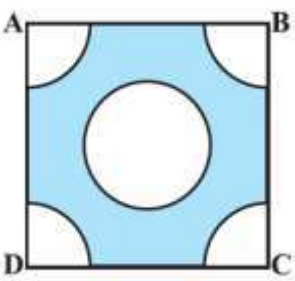

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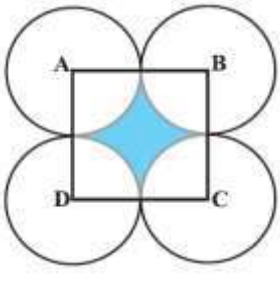


(iv)

Chapter: 15 (Probability)

54. A lot of 20 bulbs contain 4 defective ones. One bulb is drawn at random from the lot. What is the probability that this bulb is defective?

55. It is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?

56. Savita and Hamida are friends. What is the probability that both will have
(i) Different birthdays? (ii) The same birthday? (ignoring a leap year).

57. Two players, Sangeeta and Reshma, play a tennis match. It is known that the probability of Sangeeta winning the match is 0.62. What is the probability of Reshma winning the match?

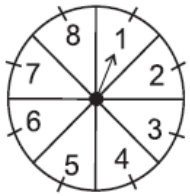
58. One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will (i) be an Ace (ii) Not be an Ace.

59. Suppose we throw a die once. (i) What is the probability of getting a number greater than 4 ? (ii) What is the probability of getting a number less than or equal to 4 ?

60. A box contains 3 Blue, 2 White, and 4 Red marbles. If a marble is drawn at random from the box, what is the probability that it will be (i) White? (ii) Blue?

61. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting (i) A king of Red colour? (ii) A Face card ?

62. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 (see in Figure), and these are equally likely outcomes. What is the probability that it will point at (i) 8 ? (ii) An odd number?



63. A bag contains 3 Red balls and 5 Black balls. A ball is drawn at random from the bag.What is the probability that the ball drawn is (i) Red ? (ii) Not Red?

64. A bag contains lemon flavoured candies only. Malini takes out one candy without looking into the bag. What is the probability that she takes out
(i) An orange flavoured candy? (ii) A lemon flavoured candy?

65. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that
(i) She will buy it ? (ii) She will not buy it ?

66. Gopi buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random from a tank containing 5 male fish and 8 female fish. What is the probability that the fish taken out is a male fish?

67. A piggy bank contains hundred 50 p coins, fifty ₹ 1 coins, twenty ₹ 2 coins and ten ₹ 5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that the coin
(i) Will be a 50 p coin ? (ii) Will not be a ₹ 5 coin?

68. A box contains 5 Red marbles, 8 White marbles and 4 Green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) Red ? (ii) White ? (iii) Not Green?

69. 12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.

70. A child has a die whose six faces show the letters as given. The die is thrown once. What is the probability of getting (i) A (ii) D

A	B	C	D	E	A

71. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) A two-digit number (ii) A perfect square number (iii) A number divisible by 5.

72. A die is thrown once. Find the probability of getting (i) A prime number; (ii) A number lying between 2 and 6 (iii) An odd number

73. A die is thrown twice. What is the probability that (i) 5 will not come up either time? (ii) 5 will come up at least once?

74. Two dice, one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is (i) 8? (ii) 13? (iii) Less than or equal to 12?

75. Harpreet tosses two different coins simultaneously (say one is of ₹ 1 and other of ₹ 2). What is the probability that she gets at least one head?

76. A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result i.e., three heads or three tails, and loses otherwise. Calculate the probability that Hanif will lose the game.

77. Five cards—the ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is then picked up at random.
(i) What is the probability that the card is the queen?
(ii) If the queen is drawn and put aside, what is the probability that the second card picked up is (a) An ace? (b) A queen?

Answer Key

1. (i) $140 = 2^2 \times 5 \times 7$ (ii) $156 = 2^2 \times 3 \times 13$ (iii) $5005 = 5 \times 7 \times 11 \times 13$
(iv) $3825 = 3^2 \times 5^2 \times 17$

2. (i) HCF = 4 , LCM = 9696 (ii) HCF = 3 , LCM = 420 (iii) HCF = 6, LCM = 360

3. 22338 **4.** (i) Terminating Decimal Expansions, 0.00416

(ii) Terminating Decimal Expansions, 2.125
(iii) Terminating Decimal Expansions, 0.009375
(iv) Terminating Decimal Expansions, 0.4
(v) Non-terminating Repeating Decimal Expansion.

5. (i) $x^2 - 4x + 1$ (ii) $x^2 + 3x + 2$ (iii) $4x^2 - x - 4$ (iv) $x^2 - x + 1$

6. (i) $-2, 4$, Sum $= 2$, Product $= -8$ (ii) $\frac{1}{2}, \frac{1}{2}$, Sum $= 1$, Product $= \frac{1}{4}$

(iii) $-2, -5$, Sum $= -7$, Product $= 10$ (iv) $-1, \frac{4}{3}$, Sum $= \frac{1}{3}$, Product $= \frac{-4}{3}$

7. $3x + 6y = 3900, x + 3y = 1300$ **8.** $2x + y = 160, 4x + 2y = 300$

9. (i) Consistent (ii) Inconsistent (iii) Consistent (iv) Consistent

10. (i) Intersect at a point (Unique Solution) (ii) coincident (Many Solution)

(iii) Parallel (No Solution) **11.** $p \neq 4$ **12.** $k = 6$ **13.** $k = 2$

14. (i) $x = 9, y = 5$ (ii) $x = 2, y = 2$ (iii) $x = 2, y = 1$ (iv) $x = 2, y = 1$

(v) $x = 4, y = -1$ (vi) $x = \frac{17}{3}, y = \frac{-2}{9}$ (vii) $x = 4, y = 2$ (viii) $x = 6, y = 0$

15. 2 cm **16.** 2.4 cm **18.** 11.2 cm **20.** 6 m **21.** 6.5 m **22.** $\sqrt{252} = 6\sqrt{7}$ m

23. 13 m **24.** $\sqrt{119}$ cm **25.** 7 cm **26.** 3 cm **27.** 8 cm **28.** 50° **29.** 70°

30. (i) $\sqrt{8} = 2\sqrt{2}$ (ii) $\sqrt{32} = 4\sqrt{2}$ **31.** (i) $(-7, 0)$ (ii) $(0, 9)$ **32.** $(7, 3)$

33. 2:7 **34.** (i) $1:1, \left(\frac{-3}{2}, 0\right)$ (ii) $5:1, \left(0, \frac{-13}{3}\right)$ **35.** (i) $p = 7$ (ii) $x = 6, y = 3$

36. 0 **37.** (i) $\sin A = \frac{7}{25}$ (ii) $\cos A = \frac{24}{25}$ (iii) $\sin C = \frac{24}{25}$ (iv) $\cos C = \frac{7}{25}$

38. (i) $\sin A = \frac{4}{5}, \cos A = \frac{3}{5}, \operatorname{cosec} A = \frac{5}{4}, \sec A = \frac{5}{3}, \cot A = \frac{3}{4}$

(ii) $\sin\theta = \frac{5}{13}, \cos\theta = \frac{12}{13}, \tan\theta = \frac{5}{12}, \cot\theta = \frac{12}{5}, \operatorname{cosec}\theta = \frac{13}{5}$

(iii) $\sin A = \frac{15}{17}, \sec A = \frac{17}{8}$ (iv) $\cos A = \frac{\sqrt{7}}{4}, \tan A = \frac{3}{\sqrt{7}}$ **39.** 1 **40.** 1

43. 28 cm **44.** 10 cm **45.** 2 units **46.** (i) $\frac{88}{21}$ cm^2 (ii) $\frac{132}{7}$ cm^2 **47.** $\frac{154}{3}$ cm^2

48. 22 cm, 231 cm^2 **49.** $\frac{275}{14}$ cm^2 **50.** 42 cm^2 **51.** 42 cm^2 **52.** $\frac{68}{7}$ cm^2 **53.** 42 cm^2

54. $\frac{4}{20} = \frac{1}{5}$ **55.** 0.008 **56.** (i) $\frac{364}{365}$ (ii) $\frac{1}{365}$ **57.** 0.38 **58.** (i) $\frac{4}{52} = \frac{1}{13}$ (ii) $\frac{48}{52} = \frac{12}{13}$

59. (i) $\frac{2}{6} = \frac{1}{3}$ (ii) $\frac{4}{6} = \frac{2}{3}$ **60.** (i) $\frac{2}{9}$ (ii) $\frac{3}{9} = \frac{1}{3}$ **61.** (i) $\frac{2}{52} = \frac{1}{26}$ (ii) $\frac{12}{52} = \frac{3}{13}$

62. (i) $\frac{1}{8}$ (ii) $\frac{4}{8} = \frac{1}{2}$ **63.** (i) $\frac{3}{8}$ (ii) $\frac{5}{8}$ **64.** (i) 0 (ii) 1

65. (i) $\frac{124}{144} = \frac{31}{36}$ (ii) $\frac{20}{144} = \frac{5}{36}$ **66.** $\frac{5}{13}$ **67.** (i) $\frac{100}{180} = \frac{5}{9}$ (ii) $\frac{170}{180} = \frac{17}{18}$

68. (i) $\frac{5}{17}$ (ii) $\frac{8}{17}$ (iii) $\frac{13}{17}$ **69.** $\frac{132}{144} = \frac{11}{12}$ **70.** (i) $\frac{2}{6} = \frac{1}{3}$ (ii) $\frac{1}{6}$

71. (i) $\frac{81}{90} = \frac{9}{10}$ (ii) $\frac{9}{90} = \frac{1}{10}$ (iii) $\frac{18}{90} = \frac{1}{5}$ **72.** (i) $\frac{3}{6} = \frac{1}{2}$ (ii) $\frac{3}{6} = \frac{1}{2}$ (iii) $\frac{3}{6} = \frac{1}{2}$

73. (i) $\frac{25}{36}$ (ii) $\frac{11}{36}$ **74.** (i) $\frac{5}{36}$ (ii) $\frac{0}{36} = 0$ (iii) $\frac{36}{36} = 1$ **75.** $\frac{3}{4}$ **76.** $\frac{6}{8} = \frac{3}{4}$

77. (i) $\frac{1}{5}$ (ii) (a) $\frac{1}{4}$ (b) $\frac{0}{4} = 0$

Class: 10th Math Four Marks Questions Total Marks: 20

Section-C: This Section contains 5 Questions and Each Question Carry four Marks. Internal Choice will be given to any three Questions in this Section. One Internal Choice will be Match the Column Question. One Question will come from Each following chapters.

Chapter: 4 (Quadratic Equations)

1. Find the discriminant of the quadratic equation and find the nature of its roots.
   (i) $2x^2 - 4x + 3 = 0$ (ii) $3x^2 - 2x + \frac{1}{3} = 0$ (iii) $3x^2 - 4\sqrt{3}\,x + 4 = 0$
2. Find the values of k if Quadratic equation $2x^2 + kx + 3 = 0$ have two equal roots.
3. Find the roots of the following quadratic equations.
   (i) $x^2 - 3x - 10 = 0$ (ii) $2x^2 + x + 4 = 0$ (iii) $2x^2 - 7x + 3 = 0$
   (iv) $5x^2 - 6x - 2 = 0$ (v) $3x^2 - 5x + 2 = 0$ (vi) $3x^2 - 2\sqrt{6}\,x + 2 = 0$
   (vii) $2x^2 - 5x + 3 = 0$ (viii) $6x^2 - x - 2 = 0$ (ix) $2x^2 - 2\sqrt{2}\,x + 1 = 0$
4. Find the roots of the following quadratic equations.
   (i) $x + \frac{1}{x} = 3 \;\; ; x \neq 0$ (ii) $x - \frac{1}{x} = 3 \;\; ; x \neq 0$
   (iii) $\frac{1}{x} - \frac{1}{x-2} = 3 \;\; ; x \neq 0, 2$ (iv) $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30} \;\; ; x \neq -4, 7$
5. Find two numbers whose sum is 27 and product is 182.
6. Find two consecutive positive integers, sum of whose squares is 365.
7. Find two consecutive odd positive integers, sum of whose squares is 290.

Chapter: 5 (Arithmetic Progressions)

8. (i) Which term of the AP: 3, 8, 13, 18 ..... is 78 ?
   (ii) Which term of the: 21, 18, 15, ... is -81 ? Also, is any term of this AP is 0 ?
   (iii) Find the number of the terms of AP: 7, 13, 19 ..... 205 ?
9. (i) Find the 31^{st} term of an AP whose 11^{th} term is 38 and the 16th term is 73.
   (ii) An AP consists of 50 terms of which 3^{rd} term is 12 and the last term is 106. Find the 29^{th} term.
   (iii) If the 3^{rd} and the 9^{th} terms of an AP are 4 and – 8 respectively, which term of this AP is zero?
10. (i) How many multiples of 4 lie between 10 and 250?
    (ii) How many three-digit numbers are divisible by 7?
11. Find the 11^{th} term from the last term of theAP: 10, 7, 4 .....-62.
12. (i) Find the sum of the first 22 terms of the AP: 8, 3, -2 .....
    (ii) Find the sum of the first 10 terms of the AP: 2, 7, 12 .....
    (iii) Find the sum of the series $-5 + (-8) + (-11) +$.....(-230).
13. If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find the 20^{th} term.

14. Find the sum of first 22 terms of an AP in which $d = 7$ and 22nd term is 149.
15. In an AP given $a = 5$, $d = 3$ and $a_n = 50$. Find n and S_n.
16. Find the sum of the first 15 multiples of 8.
17. Find the sum of the odd numbers between 0 and 50.
18. How many terms of the AP : 24, 21, 18, ... must be taken so that their sum is 78?

Chapter: 9 (Some Applications of Trigonometry)

19. (i) A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower.
    (ii) The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower, is 30°. Find the height of the tower.
20. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of tree.
21. A circus artist is climbing a 20 m long rope, which istightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole, if the angle made by the rope with the ground level is 30°.
22. A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60°. Find the length of the string, assuming that there is no slack in the string.
23. A 1.5 m tall boy is standing at some distance from a 30 m tall building. The angle of elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.
24. (i) A statue, 1.6 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of pedestal.
    (ii) From a point P on the ground the angle of elevation of the top of a 10 m tall building is 30°. A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is 45°. Find the length of the flagstaff and the distance of the building from the point P.
25. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.
26. The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30° than when it is 60°. Find the height of the tower.
27. The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45°, respectively. Find the height of the multi-storeyed building and the distance between the two buildings.

28. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50 m high, find the height of the building.
29. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45°, respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.
30. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower.
31. Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30°, respectively. Find the height of the poles and the distances of the point from the poles.

Chapter: 11 (Constructions)

32. Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.
33. Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q.
34. Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm and measure its length.
35. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.
36. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

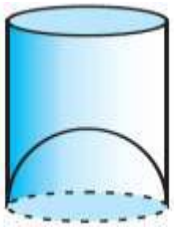
Chapter: 13 (Surface Areas and Volumes)

37. A metallic sphere of radius 4.2 cm is melted and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder.
38. A cone of height 24 cm and radius of base 6 cm is made up of modeling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere.
39. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.

40. A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4 m to form an embankment. Find the height of the embankment.

41. A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream.

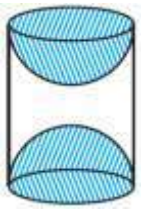
42. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.



43. A juice seller was serving his customers using glasses as shown in Figure. The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity. ($\pi = 3.14$)

44. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

45. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in Figure. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article.



46. A cubical block of side 7 cm is surmounted by a hemisphere. What is the greatest diameter the hemisphere can have? Find the surface area of the solid.

Answer Key

1. (i) $D = -8$, No Real Roots (ii) $D = 0$, Equal Roots (iii) $D = 0$, Equal Roots

2. $k = \pm\sqrt{24}$ or $\pm 2\sqrt{6}$ **3.** (i) $-2, 5$ (ii)Not possible (iii) $\frac{1}{2}, 3$ (iv) $\frac{3+\sqrt{19}}{5}, \frac{3-\sqrt{19}}{5}$

(v) $\frac{2}{3}, 1$ (vi) $\frac{\sqrt{6}}{3}, \frac{\sqrt{6}}{3}$ (vii) $\frac{3}{2}, 1$ (viii) $\frac{2}{3}, \frac{-1}{2}$ (ix) $\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}$

4. (i) $\frac{3+\sqrt{5}}{2}, \frac{3-\sqrt{5}}{2}$ (ii) $\frac{3+\sqrt{13}}{2}, \frac{3-\sqrt{13}}{2}$ (iii) $\frac{3+\sqrt{3}}{2}, \frac{3-\sqrt{3}}{2}$ (iv) $1, 2$

5. $13, 14$ **6.** $13, 14$ **7.** $11, 13$

8. (i) 16^{th} term (ii) 35^{th} term, 8^{th} term (iii) 34 **9.** (i) 178 (ii) 64 (iii) 5^{th} term

10. (i) 60 (ii) 128 **11.** -32 **12.** (i) -979 (ii) 245 (i) -8930 **13.** 200

14. 1661 **15.** $n = 16, S_n = 440$ **16.** 960 **17.** 625 **18.** $n = 13, 4$

19. (i) $15\sqrt{3}$ m (ii) $\frac{30}{\sqrt{3}} = 10\sqrt{3}$ m **20.** $8\sqrt{3}$ m **21.** 10 m **22.** $40\sqrt{3}$ m **23.** 30 m

24. (i) $0.8(\sqrt{3}+1)$ m (ii) $10(\sqrt{3}-1)$ m **25.** $20(\sqrt{3}-1)$ m **26.** $20\sqrt{3}$ m

27. $\frac{8}{\sqrt{3}-1} = 4(\sqrt{3}+1)$ m , $\frac{8}{\sqrt{3}-1}$ **28.** $\frac{50}{3}$ m **29.** $3(1+\sqrt{3})$ m **30.** $7(\sqrt{3}+1)$ m

31. $20\sqrt{3}$ m , 20 m , 60 m **37.** $\frac{2744}{1000} = 2.744$ cm **38.** 6 cm **39.** $\frac{5}{2} = 2.5$ m

40. $\frac{9}{8} = 1.125$ m **41.** 10 **42.** $r = 36$ cm , $l = \sqrt{1872} = 12\sqrt{13}$ cm

43. 196.25 cm^3 , 163.54 cm^3 **44.** 214.5 cm^2 **45.** 374 cm^2 **46.** 7 cm, 332.5 cm^2

Section-C: (OR) Match the Column Total Marks: 04

1. **Arithmetic Progressions (AP)** — **Common Difference**

(i) $\frac{-1}{2}, \frac{-1}{2}, \frac{-1}{2}, \ldots\ldots\ldots\ldots$ (a) 5

(ii) $2, \frac{5}{2}, 3, \frac{7}{2} \ldots\ldots\ldots\ldots$ (b) -1

(iii) $1, 6, 11, 16 \ldots\ldots\ldots\ldots$ (c) $\frac{1}{2}$

(iv) $\frac{3}{2}, \frac{1}{2}, -\frac{1}{2}, -\frac{3}{2} \ldots\ldots\ldots\ldots$ (d) 0

2.

Column-1	Column-2
(i) nth term of an AP	(a) $\frac{n}{2}[2a+(n-1)d]$
(ii) 2^{nd} term of an AP	(b) $a+4d$
(iii) 5^{th} term of an AP	(c) $a+(n-1)d$
(iv) Sum of n term of an AP	(d) $a+d$

3.

Column-1	Column-2
(i) 2, 4, 8, 16	(a) It is an AP and common difference is 4.
(ii) $-10, -6, -2, 2$	(b) $a_{n+1} - a_n$
(iii) Common difference	(c) It is an AP and common difference is -2.
(iv) $1, -1, -3, -5$	(d) It is not an AP

4. **In Quadratic Equation: $ax^2 + bx + c = 0$; $a \neq 0$**

Column-1	Column-2
(i) Two Distinct real roots	(a) $b^2 - 4ac = 0$ (D = 0)
(ii) Two Equal real roots	(b) $b^2 - 4ac > 0$ (D > 0)
(iii) No Real Roots	(c) $b^2 - 4ac$
(iv) Discriminant (D)	(d) $b^2 - 4ac < 0$ (D < 0)

5.

Column-1	Column-2
(i) Volume of Cone	(a) $2\pi rh$
(ii) Volume of Cylinder	(b) $\frac{1}{3}\pi r^2 h$
(iii) Volume of Hemisphere	(c) $\pi r^2 h$
(iv) Lateral (Curved) Surface Area of Cylinder	(d) $\frac{2}{3}\pi r^3$

6.

Column-1	Column-2
(i) Lateral (Curved) Surface Area of Cone	(a) $\pi r(l+r)$
(ii) Total Surface Area of Cone	(b) πrl
(iii) Lateral Surface Area of Hemisphere	(c) $4\pi r^2$
(iv) Lateral (Curved) Surface Area of Sphere	(d) $2\pi r^2$

7.

Column-1	Column-2
(i) Volume of Sphere	(a) a^3
(ii) Total Surface Area of Cylinder	(b) $6a^2$
(iii) Volume of Cube	(c) $\frac{4}{3}\pi r^3$
(iv) Total Surface Area of Cube	(d) $2\pi r(h+r)$

8.

Column-1	Column-2
(i) $\tan 60°$	(a) $\frac{\sqrt{3}}{2}$
(ii) $\tan 30°$	(b) $\frac{1}{2}$
(iii) $\sin 30°$	(c) $\frac{1}{\sqrt{3}}$
(iv) $\sin 60°$	(d) $\sqrt{3}$

Answer Key

1. (i) ⇔ (d) , (ii) ⇔ (c) , (iii) ⇔ (a) , (iv) ⇔ (b)
2. (i) ⇔ (c) , (ii) ⇔ (d) , (iii) ⇔ (b) , (iv) ⇔ (a)
3. (i) ⇔ (d) , (ii) ⇔ (a) , (iii) ⇔ (b) , (iv) ⇔ (c)
4. (i) ⇔ (b) , (ii) ⇔ (a) , (iii) ⇔ (d) , (iv) ⇔ (c)
5. (i) ⇔ (b) , (ii) ⇔ (c) , (iii) ⇔ (d) , (iv) ⇔ (a)
6. (i) ⇔ (b) , (ii) ⇔ (a) , (iii) ⇔ (d) , (iv) ⇔ (c)
7. (i) ⇔ (c) , (ii) ⇔ (d) , (iii) ⇔ (a) , (iv) ⇔ (b)
8. (i) ⇔ (d) , (ii) ⇔ (c) , (iii) ⇔ (b) , (iv) ⇔ (a)

Class: 10th Math Six Marks Questions Total Marks: 12

Section-D: This Section contains 2 Questions and Each Question Carry six Marks. In Both Questions Internal Choice will be given. Two Questions Mean, Median or Mode will come from Chapter 14 and attempt any one Question. One Theorem will come from Chapter 6 and 10.

Chapter: 14 (Statistics)

1. A survey was conducted by a group of students as a part of their environment awareness program, in which they collected the following data regarding the number of plants in 20 houses in a locality. Find the mean number of plants.

No. of Plants	0-2	2-4	4-6	6-8	8-10	10-12	12-14
No. of Houses	1	2	1	5	6	2	3

2. The following table gives the literacy rate (in percentage) of 35 cities. Find the mean literacy rate.

Literacy Rate (in %)	45-55	55-65	65-75	75-85	85-95
Number of cities	3	10	11	8	3

3. The table below shows the daily expenditure on food of 25 households in a locality.Find the Mean daily Expenditure on food by a suitable method.

Daily expenditure (In Rs.)	100-150	150-200	200-250	250-300	300-350
No. of households	4	5	12	2	2

4. Consider the following distribution of daily wages of 50 workers of a factory. Find the mean daily wages of the workers of the factory.

Daily Wages	100-120	120-140	140-160	160-180	180-200
No. of Workers	12	14	8	6	10

5. The following distribution shows the daily pocket allowance of children of a locality. Find the mean pocket allowance.

Daily Pocket Allow.	11-13	13-15	15-17	17-19	19-21	21-23	23-25
No. of Children	7	6	9	13	20	5	4

6. The marks obtained by 30 students of Class X of a certain school in a Mathematics. Find the mode of the marks obtained by the students.

Marks	10-25	25-40	40-55	55-70	70-85	85-100
No. of Students	2	3	7	6	6	6

7. The following table shows the ages of the patients admitted in a hospital during a year. Find the Mode and Mean of the following data.

Age (In Years)	5-15	15-25	25-35	35-45	45-55	55-65
No. of Patients	6	11	21	23	14	5

8. The following table gives the distribution of the life time of 400 neon lamps. Find the Median life time of lamp.

Life Time (In Hours)	1500 -2000	2000 -2500	2500 -3000	3000 -3500	3500 -4000	4000 -4500	4500 -5000
No. of Lamps	14	56	60	86	74	62	48

9. The lengths of 40 leaves of a plant are measured correct to the nearest millimetre, and the data obtained is represented in the following table. Find the Median length of the Leaves.

Length (In mm)	118-126	127-135	136-144	145-153	154-162	163 -171	172 -180
No. of Leaves	3	5	9	12	5	4	2

10. The median of the following data is 525. Find the values of x and y, if the total frequency is 100.

Class Interval	0-100	100 -200	200 -300	300 -400	400 -500	500 -600	600 -700	700 -800	800 -900	900 -1000
Freq.	2	5	x	12	17	20	y	9	7	4

11. If the median of the distribution given below is 28.5, Find the values of x and y.

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	x	20	15	y	5	60

12. The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality. Find the median and mode of the data.

Monthly Consumption (In units)	65-85	85-105	105-125	125-145	145-165	165-185	185-205
Number of Consumers	4	5	13	20	14	8	4

13. The given distribution shows the number of runs scored by some top batsmen of the world in one-day international cricket matches. Find the mode of the data.

Runs Scored	3000 -4000	4000 -5000	5000 -6000	6000 -7000	7000 -8000	8000 -9000	9000-10000	10000-11000
Number of batsmen	4	18	9	7	6	3	1	1

14. A survey regarding the heights (in cm) of 51 girls of Class X of a school was conducted and the following data was obtained. Find the median height.

Height (in cm)	Less than 140	Less than 145	Less than 150	Less than 155	Less than 160	Less than 165
Number of Girls	4	11	29	40	46	51

15. A class teacher has the following absentee record of 40 students of a class for the whole term. Find the mean number of days a student was absent.

Number of Days	0-6	6-10	10-14	14-20	20-28	28-38	38-40
Number of Students	11	10	7	4	4	3	1

16. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is Rs 18. Find the missing frequency f.

Daily pocket allowance (in Rs.)	11-13	13-15	15-17	17-19	19-21	21-23	23-25
No. of Children	7	6	9	13	f	5	4

17. The following data gives the information on the observed lifetimes (in hours) of 225 electrical components. Determine the modal lifetimes of the components.

Lifetimes (in hours)	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	10	35	52	61	38	29

18. The table below gives the percentage distribution of female teachers in the primary schools of rural areas of various states and union territories (U.T.) of India. Find the mean percentage of female teachers by all the three methods discussed in this section.

% of female Teachers	15-25	25-35	35-45	45-55	55-65	65-75	75-85
Number of States/UT	6	11	7	4	4	2	1

19. A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household. Find the mode of this data.

Family Size	1-3	3-5	5-7	7-9	9-11
Number of families	7	8	2	2	1

20. The following distribution gives the state-wise teacher-student ratio in higher secondary schools of India. Find the mode and mean of this data.

No. of students per teacher	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55
No. of States/UT	3	8	9	10	3	0	0	2

Answer Key

1. $\frac{162}{20} = 8.1$ **2.** $\frac{2430}{35} = 69.43$ **3.** $\frac{5275}{25} = 211$ **4.** $\frac{7260}{50} = 145.20$

5. $\frac{1152}{64} = 18$ **6.** $40 + \frac{60}{5} = 52$ **7.** $Z = 35 + \frac{20}{11} = 36.8$, $\bar{X} = \frac{2830}{80} = 35.37$

8. $3000 + \frac{17500}{43} = 3406.98$ **9.** $144.5 + \frac{9}{4} = 146.75$ **10.** $x = 9$, $y = 15$

11. $x = 8$, $y = 7$ **12.** $M = 125 + 12 = 137$, $Z = 125 + \frac{140}{13} = 135.76$

13. $4000 + \frac{14000}{23} = 4608.7$ **14.** $145 + \frac{72.5}{18} = 149.03$ **15.** $\frac{499}{40} = 12.48$

16. $f = 20$ **17.** $60 + \frac{180}{32} = 65.62$ **18.** $\bar{X} = \frac{1390}{35} = 39.71$

19. $3 + \frac{2}{7} = 3.28$ **20.** $Z = 30 + \frac{5}{8} = 30.6$, $\bar{X} = \frac{1022.5}{35} = \frac{204.5}{7} = 29.2$

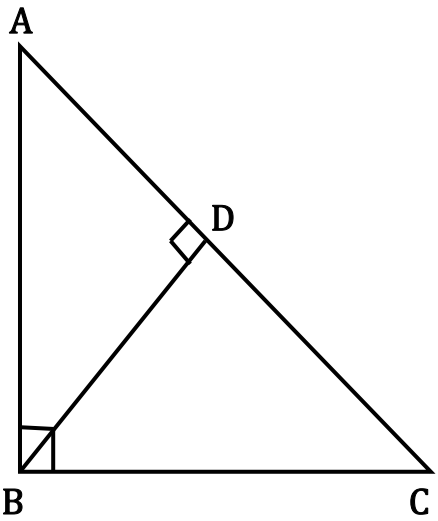
1. Pythagoras Theorem

Definition: **In a right angled triangle, the square of the hypotenuse is equal to the sum the squares of the other two sides.**

Given: In Right Angle ΔABC , $\angle B = 90°$

To Prove: $(AC)^2 = (AB)^2 + (BC)^2$

Construction: Draw $BD \perp AC$



Proof: In ΔABC and ΔADB

$\angle A = \angle A$ (Common)

$\angle ABC = \angle ADB$ (Each 90°)

$\Delta ABC \sim \Delta ADB$ (By AA Rule)

$\frac{AB}{AD} = \frac{AC}{AB}$

$(AB)^2 = AC \times AD$ ----------①

Similarly $\Delta ABC \sim \Delta BDC$

$(BC)^2 = AC \times DC$ ----------②

Adding ① and ②

$(AB)^2 + (BC)^2 = (AC \times AD) + (AC \times DC)$

$(AB)^2 + (BC)^2 = AC \times (AD + DC)$

$(AB)^2 + (BC)^2 = (AC \times AC)$ $(\because AC = AD + DC)$

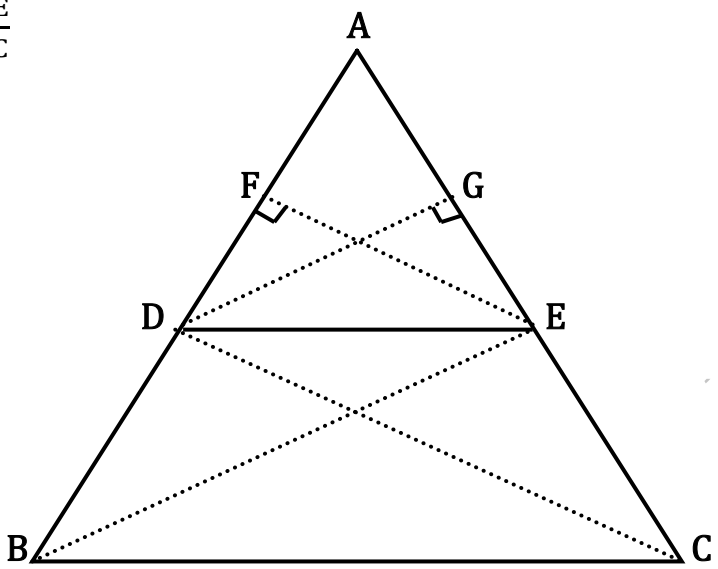
$(AB)^2 + (BC)^2 = (AC)^2$

2. Thales (Or) Basic Proportionality Theorem (BPT)

Definition: 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.

Given: In ΔABC , $DE \parallel BC$

To Prove: $\frac{AD}{DB} = \frac{AE}{EC}$



Construction: Draw $DG \perp AC$ from D. Draw $EF \perp AB$ from E. Also Join CD and BE

Proof: Area of Triangle $= \frac{1}{2} \times$ Base $\times$ Height

In ΔADE and ΔBDE

$$\frac{ar(\Delta ADE)}{ar(\Delta BDE)} = \frac{\frac{1}{2} \times AD \times EF}{\frac{1}{2} \times BD \times EF}$$

$$\frac{ar(\Delta ADE)}{ar(\Delta BDE)} = \frac{AD}{BD} \quad \text{----------} (1)$$

Now in ΔADE and ΔCDE

$$\frac{ar(\Delta ADE)}{ar(\Delta CDE)} = \frac{\frac{1}{2} \times AE \times DG}{\frac{1}{2} \times CE \times DG}$$

$$\frac{ar(\Delta ADE)}{ar(\Delta CDE)} = \frac{AE}{CE} \quad \text{----------} (2)$$

ΔBDE and ΔCDE are on the same base DE and between the same parallel lines BC and DE.

$\therefore ar(\Delta BDE) = ar(\Delta CDE)$ ----------(3)

From (1), (2) and (3)

$$\frac{AD}{DB} = \frac{AE}{EC}$$

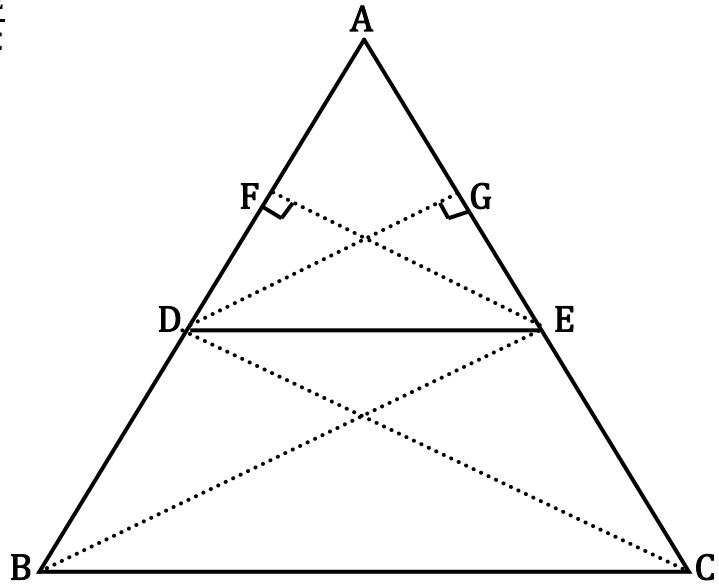
2. Thales (Or) Basic Proportionality Theorem (BPT)

2nd Method

Definition: 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.

Given: In ΔABC , $DE \parallel BC$

To Prove: $\frac{AD}{DB} = \frac{AE}{EC}$



Construction: Draw $DG \perp AC$ from D. Draw $EF \perp AB$ from E. Also Join CD and BE

Proof: We know that two triangles on the same base and between the same parallel lines are equal in area.

$\therefore ar(\Delta BDE) = ar(\Delta CDE)$ ----------① (Same Base DE and $DE \parallel BC$)

Reciprocal of Equation ①

$$\frac{1}{ar(\Delta BDE)} = \frac{1}{ar(\Delta CDE)}$$

Multiply with $ar(\Delta ADE)$ both sides

$$\frac{ar(\Delta ADE)}{ar(\Delta BDE)} = \frac{ar(\Delta ADE)}{ar(\Delta CDE)}$$

$$\frac{\frac{1}{2} \times AD \times EF}{\frac{1}{2} \times BD \times EF} = \frac{\frac{1}{2} \times AE \times DG}{\frac{1}{2} \times EC \times DG}$$ (Area of Triangle $= \frac{1}{2} \times$ Base $\times$ Height)

$$\frac{AD}{DB} = \frac{AE}{EC}$$

3. Tangents Theorem of Circle

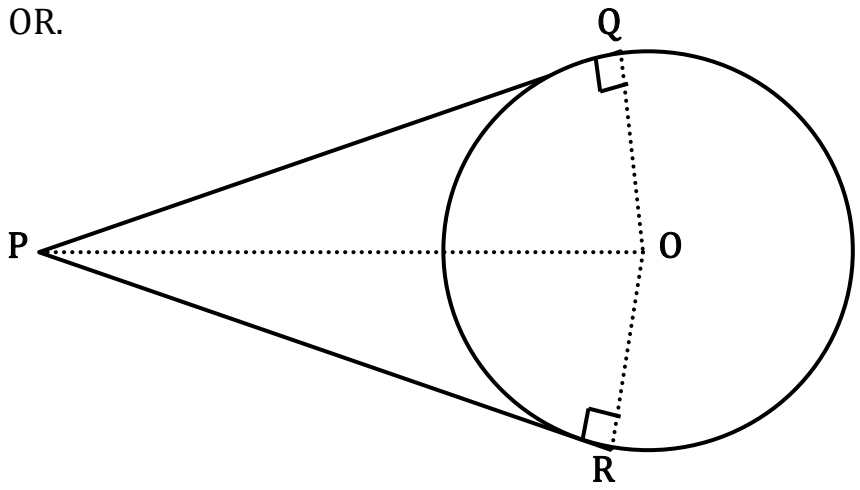
Definition: **The lengths of tangents drawn from an external point to a circle are equal.**

Given: Circle with centre O and a point P lying outside the circle.

Two tangents PQ and PR on the circle from P.

To Prove: PQ = PR

Construction: Join OP, OQ and OR.



Proof: We know that the angle between tangent and radius of a circle is right angle (90°)

$\therefore \angle OQP = \angle ORP = 90°$ ----------①

Now in ΔOQP and ΔORP

$OQ = OR$ (Radii of Circle)

$OP = OP$ (Common Side)

$\angle OQP = \angle ORP = 90°$ (From ①)

$\therefore \Delta OQP \cong \Delta ORP$ (By RHS Rule)

$\therefore PQ = PR$ (By C.P.C.T)