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MATHS



SCIENCE



SOCIAL



Arithmetic Progression

1marks

- 1) What is arithmetic Progression
- 2) What is the general formula of A,P
- 3) What is the n th term of A,P?
- 4) Write first four terms of the AP, when the first term $a = 4$ and the common difference $d = -3$ are given
- 5) For the AP 3,1,-1,-3 ----- write the first term and the common difference.
- 6) If n th term of an arithmetic progression $a_n = 24 - 3n$, then find its second term .
- 7) If in an AP, $d = -4$, $n = 7$, $a_n = 4$ then find a .
- 8) In an AP, if $a = 3.5$, $d = 0$, $n = 101$ then find a_n ?
- 9) Which term of the AP : 21, 18, 15, . . . is -81
- 10) If first term of an AP is -5 and common difference is 2 then find the sum of first 6 terms.

2 mark questions,

- 1) How many two-digit numbers are divisible by 3?
- 2) The 17th term of an AP exceeds its 10th term by 7. Find the common difference
- 3) Two APs have the same common difference. The difference between their 100th terms is 100, what is the difference between their 1000th terms?
- 4) How many three-digit numbers are divisible by 7?
- 5) How many multiples of 4 lie between 10 and 250?
- 6) Find the sum of first 1000 positive integers.
- 7) Find the sum of first 22 terms of an AP in which $d = 7$ and 22nd term is 149.
- 8) Find the sum of the first 40 positive integers divisible by 6.
- 9) Find the sum of the first 15 multiples of 8.
- 10) Find the sum of the odd numbers between 0 and 50.

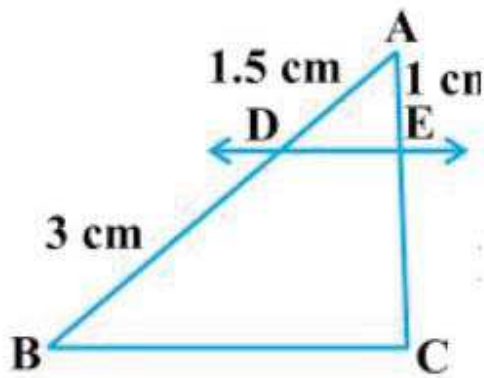
4/5 marks questions ,

- 1) Find the 31st term of an AP whose 11th term is 38 and the 16th term is 73.
- 2) An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29th term.
- 3) If the 3rd and the 9th terms of an AP are 4 and -8 respectively, which term of this AP is zero?.
- 4) Which term of the AP : 3, 15, 27, 39, . . . will be 132 more than its 54th term?
- 5) The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP

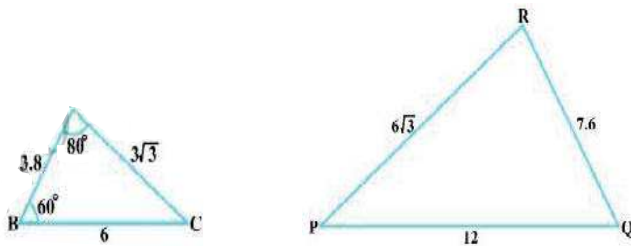
Triangles

1mark

- 1) Write two conditions for two triangles to be similar
- 2) Write SSS condition for similarity.
- 3) Write AAA/AA condition for similarity.
- 4) Write ASA condition for similarity
- 5) Determine whether sides 7 cm, 24 cm, 25 cm form a right angled triangle.
- 6) Determine whether sides 3 cm, 8 cm, 6 cm form a right angled triangle
- 7) Determine whether sides 50 cm, 80 cm, 10 cm form a right angled triangle.
- 8) Determine whether sides 13 cm, 12 cm, 5 cm form a right angled triangle
- 1) Two polygons of the same number of sides are similar if their corresponding angles are---- and their corresponding sides are-----
- 2) State basic proportionality theorem.
- 3) In Fig, $DE \parallel BC$. Find EC



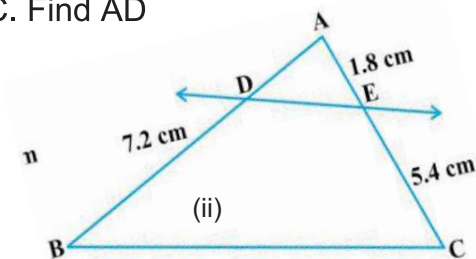
- 4) Observe Fig. and then find $\angle R$.



- 5) Let $\triangle ABC \sim \triangle DEF$ and their areas be, 64 cm^2 and 121 cm^2 respectively, . If $EF = 15.4 \text{ cm}$, find BC

SIMILAR EXAMPLES

- 1) All circles are -----
- 2) All squares are -----
- 3) All----- triangles are similar.
- 4) In Fig, $DE \parallel BC$. Find AD

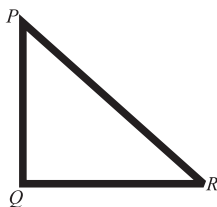


MCQS

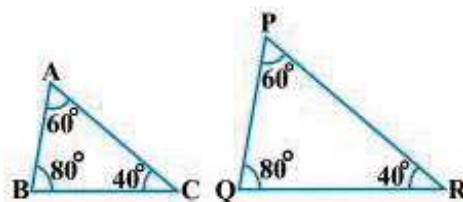
- 1) ABC and BDE are two equilateral triangles such that D is the midpoint of BC. Ratio of the areas of triangles ABC and BDE is
(A) 2 : 1 (B) 1 : 2 (C) 4 : 1 (D) 1 : 4

- 2) Sides of two similar triangles are in the ratio 4 : 9. Areas of these triangles are in the ratio
(A) 2 : 3 (B) 4 : 9 (C) 81 : 16 (D) 16 : 81

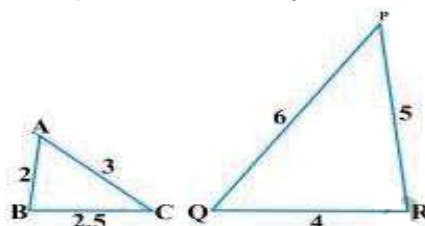
- 3) In triangle $PR^2 = PQ^2 + QR^2$ then what is the value of $\angle PQR$



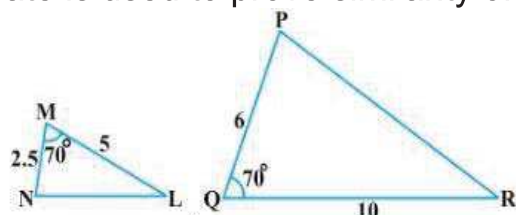
- 4) Which postulate is used to prove similarity of two triangles given below.



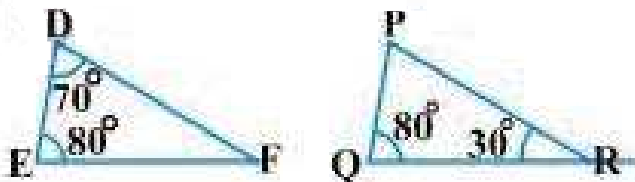
- 5) Which postulate is used to prove similarity of two triangles given below.



6) Which postulate is used to prove similarity of two triangles given below.



7) Which postulate is used to prove similarity of two triangles given below.

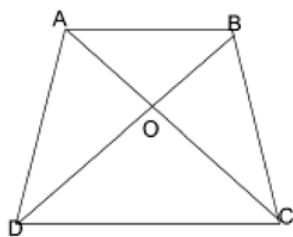


4marks

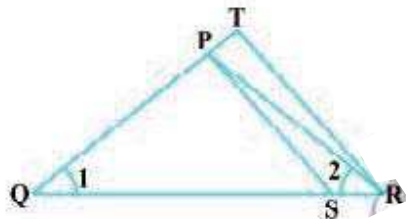
- 1) State and prove Thales Theorem|Basic proportionality Theorem
- 2) Prove that “The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides”
- 3) Prove that “If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportion) and hence the two triangles are similar”
- 4) In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides
- 5) State and prove “Converse of Pythagoras Theorem

2marks / 3marks

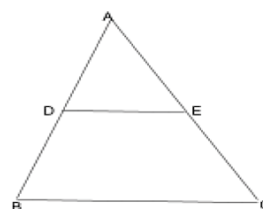
- 1) Diagonals AC and BD of a trapezium ABCD with $AB \parallel DC$ intersect each other at the point O. Using a similarity criterion for two triangles, show that $OA/OC = OB/OD$



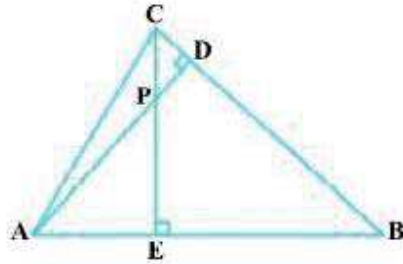
- 2) In Fig. $QR/QS = QT/PR$ and $\angle 1 = \angle 2$. Show that $\triangle PQS \sim \triangle TQR$.



- 3) In fig, if $\angle ABE = \angle ACD$, show that $\angle ADE \sim \angle ABC$.

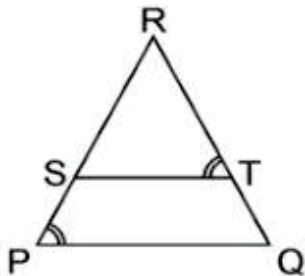


- 4) In Fig altitudes AD and CE of $\triangle ABC$ intersect each other at the point P. Show that: (i) $\triangle AEP \sim \triangle CDP$ (ii) $\triangle ABD \sim \triangle CBE$ (iii) $\triangle AEP \sim \triangle ADB$ (iv) $\triangle PDC \sim \triangle BEC$

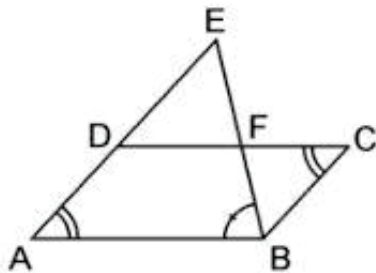


Similarly you can try (ii), (iii), and (iv) in text book

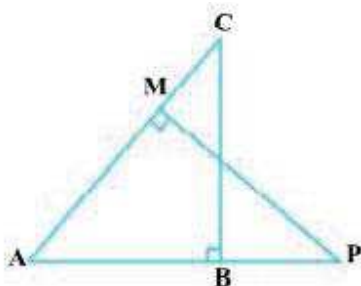
- 5) S and T are points on sides PR and QR of $\triangle PQR$ such that $\angle P = \angle RTS$. Show that $\triangle RPQ \sim \triangle RTS$



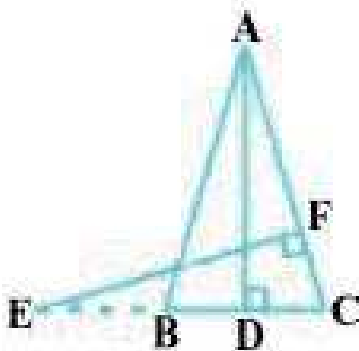
- 6) E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\triangle ABE \sim \triangle CFB$.



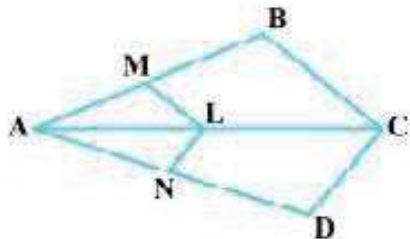
- 7) In Fig, ABC and AMP are two right triangles, right angled at B and M respectively. Prove that: (i) $\triangle ABC \sim \triangle AMP$ (ii) $CA/PA = BC/MP$



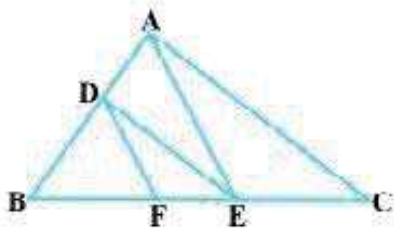
- 8) In Fig, E is a point on side CB produced of an isosceles triangle ABC with $AB = AC$. If $AD \perp BC$ and $EF \perp AC$, prove that $\triangle ABD \sim \triangle ECF$.



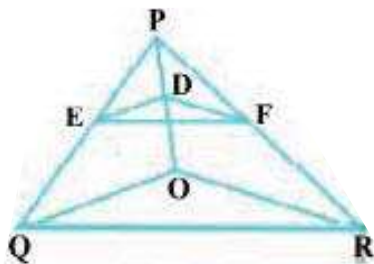
- 1) In fig, if $LM \parallel CB$ and $LN \parallel CD$, prove that $AM/AB = AN/AD$



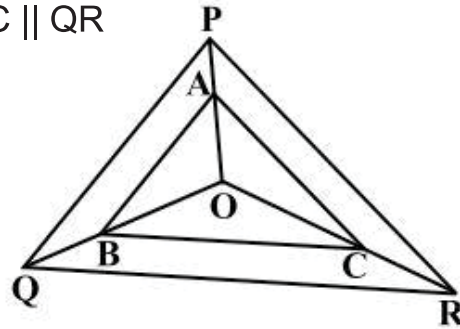
- 2) In fig, $DE \parallel AC$ and $DF \parallel AE$. Prove that $BF/FE = BE/EC$.



- 3) In Fig, $DE \parallel OQ$ and $DF \parallel OR$. Show that $EF \parallel QR$.



- 4) In Fig, A, B and C are points on OP, OQ and OR respectively such that $AB \parallel PQ$ and $AC \parallel PR$. Show that $BC \parallel QR$



- 5) ABCD is a trapezium in which $AB \parallel DC$ and its diagonals intersect each other at the point O. Show that $AO/BO = CO/DO$
- 6) The diagonals of a quadrilateral ABCD intersect each other at the point O such that $AO/BO = CO/DO$. Show that ABCD is a trapezium.
- 7) ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2AC^2$
- 8) ABC is an isosceles triangle with $AC = BC$. If $AB^2 = 2AC^2$, prove that ABC is a right triangle
- 9) In an equilateral triangle, prove that three times the square of one side is equal to four times the square of one of its altitudes.

3) PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

1 mark

- 1) Write algebraic interpretation for the pair of lines represented by equations

$$x - 2y = 0$$

$$3x + 4y - 20 = 0$$

- 2) Write algebraic interpretation for the pair of lines represented by equations

$$2x + 3y - 9 = 0$$

$$4x + 6y - 18 = 0$$

3) Write algebraic interpretation for the pair of lines represented by equations

$$x + 2y - 4 = 0$$

$$2x + 4y - 12 = 0$$

4) Write the conditions for ratios of coefficients of linear equations representing parallel lines

5) Write the conditions for ratios of coefficients of linear equations representing intersecting lines

6) Write the conditions for ratios of coefficients of linear equations representing coincident lines

7) Write algebraic interpretation for the pair of lines represented by

$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

8) Write algebraic interpretation for the pair of lines represented by

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

9) Write algebraic interpretation for the pair of lines represented by

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

10) How many solutions can we get by solving these equations?

$$3x + 2y = 5$$

$$2x - 3y = 7$$

11) How many solutions can we get by solving these equations?

$$9x + 3y + 12 = 0$$

$$18x + 6y + 24 = 0$$

12) How many solutions can we get by solving these equations?

$$6x - 3y + 10 = 0$$

$$2x - y + 9 = 0$$

12) State whether given equations represent consistent or inconsistent lines.

$$3x + 2y = 5$$

$$2x - 3y = 7$$

13) State whether given equations represent consistent or inconsistent lines

$$9x + 3y + 12 = 0$$

$$18x + 6y + 24 = 0$$

14) State whether given equations represent consistent or inconsistent lines

$$6x - 3y + 10 = 0$$

$$2x - y + 9 = 0$$

15) Solve using suitable method

$$3x + 2y = 5$$

$$2x - 3y = 7$$

Try these

1) $x + y = 5$ and $2x - 3y = 4$

2) $3x + 4y = 10$ and $2x - 2y = 2$

3) $8x + 5y = 9$ and $3x + 2y = 4$

4 marks

1) solve graphically

$$x + 3y = 6$$

$$2x - 3y = 12$$

2) Solve graphically $x + y = 5$

$$2x + 2y = 10$$

3) Solve graphically $2x - 2y = 2$

$$4x - 4y = 5$$

Solve graphically (Try these on your own)

1) $x - 2y = 0$

$$3x + 4y - 20 = 0$$

2) $2x + 3y - 9 = 0$

$$4x + 6y - 18 = 0$$

3) $x + 2y - 4 = 0$

$$2x + 4y - 12 = 0$$

2 marks questions

- 1) The difference between two numbers is 26 and one number is three times the other. Find them
- 2) The larger of two supplementary angles exceeds the smaller by 18 degrees. Find them
- 3) The coach of a cricket team buys 7 bats and 6 balls for ₹ 3800. Later, she buys 3 bats and 5 balls for ₹ 1750. Find the cost of each bat and each ball.
- 4) Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages?
- 5) If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes $\frac{1}{2}$ if we only add 1 to the denominator. What is the fraction?
- 6) Five years ago, Nuri was thrice as old as Sonu. Ten years later, Nuri will be twice as old as Sonu. How old are Nuri and Sonu?
- 7) The sum of the digits of a two-digit number is 9. Also, nine times this number is twice the number obtained by reversing the order of the digits. Find the number
- 8) A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction
- 9) Yash scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Yash would have scored 50 marks. How many questions were there in the test?

- 10) Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars?
- 11) The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimensions of the rectangle

3 marks questions

- 1) If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes $\frac{1}{2}$ if we only add 1 to the denominator. What is the fraction?
- 2) The taxi charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10 km, the charge paid is ₹ 105 and for a journey of 15 km, the charge paid is ₹ 155. What are the fixed charges and the charge per km? How much does a person have to pay for travelling a distance of 25 km?
- 3) A fraction becomes $\frac{9}{11}$, if 2 is added to both the numerator and the denominator. If, 3 is added to both the numerator and the denominator it becomes $\frac{5}{6}$. Find the fraction
- 4) The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there?

Meena went to a bank to withdraw ₹ 2000. She asked the cashier to give her ₹ 50 and ₹ 100 notes only. Meena got 25 notes in all. Find how many notes of ₹ 50 and ₹ 100 she received.

- 5) A lending library has a fixed charge for the first three days and an additional charge for each day thereafter. Saritha paid ₹ 27 for a book kept for seven days, while Susy paid ₹ 21 for the book she kept for five days. Find the fixed charge and the charge for each extra day
- 6) A part of monthly hostel charges is fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 20 days she has to pay ₹ 1000 as hostel charges whereas a student B, who takes food for 26 days, pays ₹ 1180 as hostel charges. Find the fixed charges and the cost of food per day

4) CIRCLES

1 marks

- 1) 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
- 2) If TP and TQ are the two tangents to a circle with centre O so that $\angle POQ = 110^\circ$, then what is the value of $\angle PTQ$.
- 3) If tangents PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 80° , then what is the value of $\angle POA$
- 4) 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. Length PQ is
- 5) 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

- 6) In how many points, tangent to a circle intersects it
- 7) what is the length of the chord when secant touches(cuts) the circle.
- 8) write the relation between radius and tangent
- 9) In a circle what is the number of tangents parallel secant.
- 10) How many tangents can be drawn from an external point to a circle.

3 marks

- 1) Prove that “The lengths of tangents drawn from an external point to a circle are equal”
- 2) The tangent at any point of a circle is perpendicular to the radius through the point of contact.

5) Area related to circles

1 marks

- 1) If the perimeter and the area of a circle are numerically equal, then what is the radius of the circle
- 2) What is the Area of a sector of angle p (in degrees) of a circle with radius R
- 3) What is the length of an arc of a sector of angle p

2 marks questions.

- 1) Find the area of a sector of a circle with radius 6 cm if angle of the sector is 60°
- 2) Find the area of a quadrant of a circle whose circumference is 22 cm
- 3) The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.
- 4) A chord of a circle of radius 10 cm subtends a right angle at the centre.
Find the area of the corresponding major sector
- 5) In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the length of the arc.

6) CONSTRUCTIONS

3marks

- 1) Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle.
- 2) Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.
- 3) Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangle.
- 4) Draw a triangle ABC with side $BC = 6$ cm, $AB = 5$ cm and $\angle ABC = 60^\circ$. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.
- 5) Draw a triangle ABC with side $BC = 7$ cm, $\angle B = 45^\circ$, $\angle A = 105^\circ$. Then, construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of ABC.
- 6) Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.
- 7) Let ABC be a right triangle in which $AB = 6$ cm, $BC = 8$ cm and $\angle B = 90^\circ$. BD is the perpendicular from B on AC. The circle through B, C, D is drawn.
- 8) 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 tangent to each circle from the centre of the other circle.
- 9) Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameters each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q.
- 10) 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. Also verify the measurement by actual calculation.

2 Marks question from constructions

- 1) 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
- 2) Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60° .
- 3) Draw a line segment of length 8 cm and divide it in the ratio 3:2. Measure the two parts.

7) COORDINATE GEOMETRY

1 Mark

- 1) Write the formula for section formula
- 2) Write the formula to find coordinates of the mid point $p(x,y)$ joining the points $A(x_1,y_1)$ and (x_2,y_2) in the ratio 1:1
- 3) If the ratio in which $p(x,y)$ divides the AB is $k:1$ then coordinates of the point p will be
- 4) Write the formula to find coordinates of the centroid $p(x,y)$ joining the points $A(x_1,y_1)$, $B(x_2,y_2)$ and $C(x_3,y_3)$ in the ratio 2:1.
- 5) Write the formula to find area of the triangle.
- 6) Write the formula to find the distance of the line joining the points $A(x_1,y_1)$ and (x_2,y_2)
- 7) The coordinates of the origin in coordinate plane are $(0,0)$
- 8) Write the formula to find the distance between a point $P(x,y)$ and origin

2 Mark

- 9) Find the distance between the points $(2,3)$ and $(4,1)$
- 10) Find the distance between the points $(-5,7)$ and $(-1,3)$

- 12) Find the distance between the points (a,b) and $(-a,-b)$
- 13) Find the distance between the points $(0,0)$ and $(36,15)$
- 14) Find the ratio in which X axis divides the join of $A(2,-3)$ and $B(5,6)$
- 1) Find the coordinates of the point which divides the join of $(-1, 7)$ and $(4, -3)$ in the ratio $2 : 3$
- 2) Determine if the points $(1, 5)$, $(2, 3)$ and $(-2, -11)$ are collinear.
- $\begin{matrix} 1 & 5 \\ 2 & 3 \\ -2 & -11 \end{matrix}$

Try the following on your own

- 1) Check whether $(5, -2)$, $(6, 4)$ and $(7, -2)$ are the vertices of an isosceles triangle.
- 2) Find the coordinates of the point which divides the join of $(-1, 7)$ and $(4, -3)$ in the ratio $2 : 3$
- 3) Find the coordinates of the points of trisection of the line segment joining $(4, -1)$ and $(-2, -3)$.
- 4) Find the ratio in which the line segment joining the points $(-3, 10)$ and $(6, -8)$ is divided by $(-1, 6)$
- 5) If $(1, 2)$, $(4, y)$, $(x, 6)$ and $(3, 5)$ are the vertices of a parallelogram taken in order, find x and y
- 6) Find the coordinates of a point A, where AB is the diameter of a circle whose centre is $(2, -3)$ and B is $(1, 4)$
- 7) Find the area of a rhombus if its vertices are $(3, 0)$, $(4, 5)$, $(-1, 4)$ and $(-2, -1)$ taken in order.
- 8) Find the area of the triangle whose vertices are : $(2, 3)$, $(-1, 0)$, $(2, -4)$

8) REAL NUMBERS

1mark

- 1) Explain why $3 \times 5 \times 7 + 7$ is a composite number.
- 2) Check whether 6^n can end with the digit 0 for any natural number n.
- 3). Without actually performing the long division, state whether the rational numbers $\frac{23}{5^2 \times 2^3}$ will have a terminating decimal expansion or a non-terminating repeating decimal expansion:
- 4) Without actually performing the long division, state whether the rational numbers $\frac{129}{5^7 \times 2^2 \times 7^5}$ will have a terminating decimal expansion or a non-terminating repeating decimal expansion:
- 5) Without actually performing the long division, state whether the rational numbers $\frac{35}{50}$ will have a terminating decimal expansion or a non-terminating repeating decimal expansion:
- 6) The product of two numbers is 120. If their H.C.F. is 6 what is their L.C.M.
- 7) If the L.C.M of x and y is z, what is their H.C.F.
- 8) The L.C.M. of two numbers is 63 and their H.C.F. is 9. If one of the numbers is 27, Then what is the other number.
- 9) Find the HCF of 11, 22 and 44.

2 Mark

- 1) Show that $5 - \sqrt{3}$ is irrational.

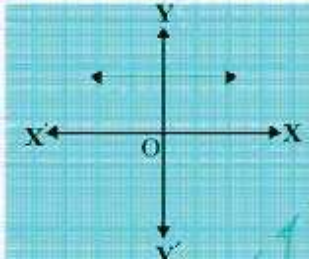
Try the following on your own.

- 1) Show that $5 + \sqrt{3}$ is irrational.
- 2) Prove that $3 + \sqrt{2}$ is irrational.
- 3) Show that $3\sqrt{2}$ is irrational.
- 4) Show that $1/\sqrt{2}$ is irrational.
- 5) Show that $7\sqrt{5}$ is irrational.
- 6) Show that $6 + \sqrt{2}$ is irrational.

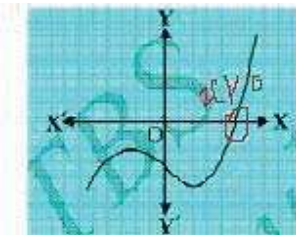
9) POLYNOMIALS

1marks

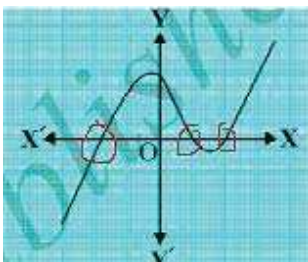
1) By the graph given below for the polynomial $p(x)$, find the number of zeros .



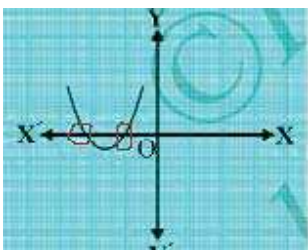
2) By the graph given below for the polynomial $p(x)$, find the number of zeros .



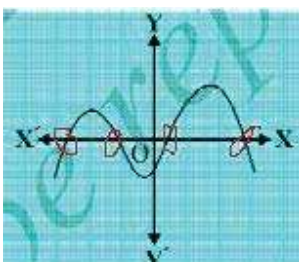
3) By the graph given below for the polynomial $p(x)$, find the number of zeros .



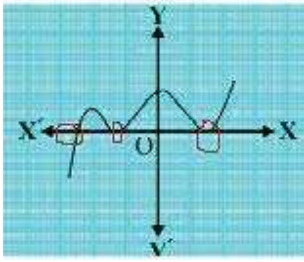
4) By the graph given below for the polynomial $p(x)$, find the number of zeros .



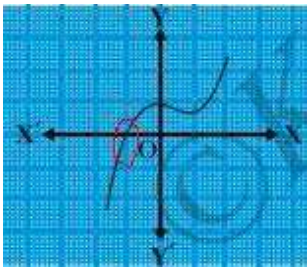
5) By the graph given below for the polynomial $p(x)$, find the number of zeros .



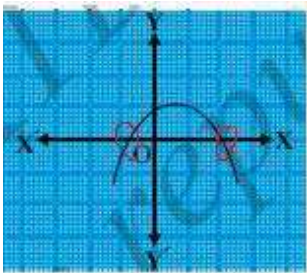
6) By the graph given below for the polynomial $p(x)$, find the number of zeros .



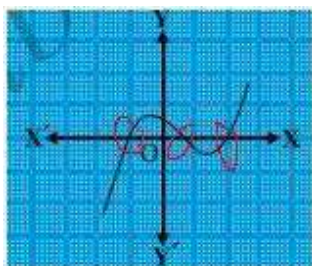
7) By the graph given below for the polynomial $p(x)$, find the number of zeros .



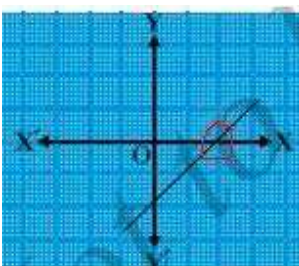
8) By the graph given below for the polynomial $p(x)$, find the number of zeros .



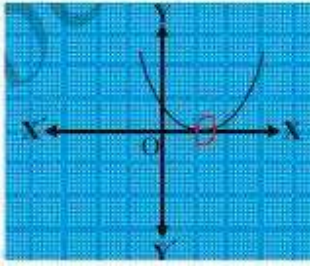
9) By the graph given below for the polynomial $p(x)$, find the number of zeros .



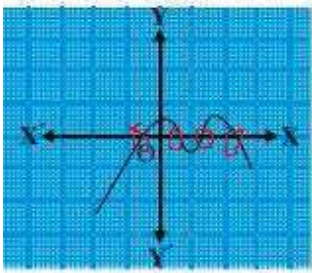
10) By the graph given below for the polynomial $p(x)$, find the number of zeros .



11) By the graph given below for the polynomial $p(x)$, find the number of zeros .



12) By the graph given below for the polynomial $p(x)$, find the number of zeros .



13) Find degree of the polynomial. $2x - 3$

14) Find degree of the polynomial. $y^2 - 2$

15) Find degree of the polynomial. $2x + 5 - x^2$

16) Find degree of the polynomial. $x^3 + 1$

17) Find degree of the polynomial. $4z^2 + 1/7$

18) Find degree of the polynomial. $x^2(x - 1)$

19) Find degree of the polynomial. $2(x - 1)(x - 3)$

20) Find degree of the polynomial. $2x^2 + 3x^2y + 7$

21) Find degree of the polynomial. $3x^3 + x^2 + 2x + 5$

22) Find the zeroes of the quadratic polynomials $x^2 - 2x - 8$

23) Find the zeroes of the quadratic polynomials $4u^2 + 8u$

24) Find the zeroes of the quadratic polynomials $t^2 - 15$

25) Find the zeroes of the quadratic polynomials $3x^2 - x - 4$.

26) Find a sum and product of zeroes $1/4, -1$.

27) Find a sum and product of zeroes $1, 1$

10) QUADRATIC EQUATIONS

1marks

1)What is standard form of quadratic equation

2)Represent the situation in the form of quadratic equation

“The product of two consecutive positive integers is 306. We need to find the integers.”

3)Represent the situation in the form of quadratic equation

The area of a rectangular plot is 528 m^2 . The length of the plot (in metres) is one more than twice its breadth. We need to find the length and breadth of the plot

4)Represent the situation in the form of quadratic equation

Rohan’s mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. We would like to find Rohan’s present age

5) If α and β are the zeroes of the quadratic polynomial $ax^2 + bx + c$, then $\alpha + \beta = -b/a$, $\alpha \times \beta = c/a$.

6)A quadratic polynomial in x with real coefficients is of the form

$ax^2 + bx + c$, where a, b, c are real numbers with $a \neq 0$.

Formula of quadratic equation $ax^2 + bx + c = 0$ is

$X = -b \pm \frac{\sqrt{b^2 - 4ac}}{2a}$ here $b^2 - 4ac \geq 0$ ಆಗಿರಬೇಕು.

7) A quadratic equation $ax^2 + bx + c = 0$ has

(i) two distinct real roots, if $b^2 - 4ac > 0$,

(ii) two equal roots (i.e., coincident roots), if $b^2 - 4ac = 0$,

(iii) no real roots, if $b^2 - 4ac < 0$.

2marks

- 1) Find the roots of the equation $2x^2 - 5x + 3 = 0$, by factorisation.

Try the following on your own

- 1) Find the roots of the equation $x^2 - 3x - 10 = 0$, by factorisation.
2) Find the roots of the equation $2x^2 + x - 6 = 0$, by factorisation.
3) Find the roots of the equation $100x^2 - 20x + 1 = 0$, by factorisation.
4) solve $2x^2 - x + \frac{1}{8} = 0$ by factorisation.
2) Find the roots of the quadratic equations, by formula method.

$$2x^2 - 7x + 3 = 0$$

- 1) Solve $2x^2 + x - 528 = 0$ by using the quadratic formula.
2) Solve $3x^2 - 5x + 2 = 0$ by using the quadratic formula.
3) Solve $x^2 + 4x + 5 = 0$ by using the quadratic formula
4) Solve $2x^2 - 2\sqrt{2}x + 1 = 0$ by using the quadratic formula
5) Solve $2x^2 - 7x + 3 = 0$ by using the quadratic formula
6) Solve $2x^2 + x - 4 = 0$ by using the quadratic formula
7) solve $4x^2 + 4\sqrt{3}x + 3 = 0$ by using the quadratic formula
8) solve $2x^2 + x + 4 = 0$ by using the quadratic formula

3 marks questions

- 1) Solve $3x^2 - 5x + 2 = 0$ by method of completing the square
2) Solve $5x^2 - 6x - 2 = 0$ by method of completing the square
3) Solve $4x^2 + 3x + 5 = 0$ by method of completing the square
4) Solve $2x^2 - 7x + 3 = 0$ by method of completing the square
5) Solve $2x^2 + x - 4 = 0$ by method of completing the square

3 marks questions

- 1) In a class test, the sum of Shefali's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects.
2). The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the sides of the field.

3). The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

4 Marks / 5 Marks

4). A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

5). Two water taps together can fill a tank in $3\frac{9}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

6). An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11km/h more than that of the passenger train, find the average speed of the two trains.

7). Sum of the areas of two squares is 468 m². If the difference of their perimeters is 24 m, find the sides of the two squares.

INTRODUCTION TO TRIGONOMETRY

1marks

1) The value of $\sin A$ or $\cos A$ never exceeds 1, whereas the value of $\sec A$ or $\operatorname{cosec} A$ is always greater than or equal to 1

2) $\sin (90-A) = \cos A$, $\cos (90-A) = \sin A$

$\tan (90-A) = \cot A$, $\cot (90-A) = \tan A$

$\sec (90-A) = \operatorname{cosec} A$, $\operatorname{Cosec} (90-A) = \sec A$

3) $\sin^2 A + \cos^2 A = 1$,

$\sec^2 A - \tan^2 A = 1$,

$\operatorname{cosec}^2 A = 1 + \cot^2 A$,

2 Marks questions

- 1) If A and B are acute angles such that $\cos A = \cos B$, then show that $A = B$.
- 2) If $\tan(A+B) = \sqrt{3}$ and $\tan(A-B) = 1/\sqrt{3}$; $\theta < A+B \leq 90^\circ$; $A > B$, find A and B .
- 3) If $\sin \theta - \cos \theta = \frac{1}{2}$, then find the value of $\sin \theta + \cos \theta$.
- 4) Show that: $\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ = 1$
- 5) If $\tan 2A = \cot (A-18^\circ)$, where $2A$ is an acute angle, find the value of A .
- 6) If $\tan A = \cot B$, prove that $A+B = 90^\circ$
- 7) If $\sec 4A = \operatorname{cosec} (A-20^\circ)$, where $4A$ is an acute angle, find the value of A .
- 8) If $\sec 4A = \operatorname{cosec} (A-20^\circ)$, where $4A$ is an acute angle, find the value of A .
- 9) If A , B , and C are interior angles of a triangle ABC , then show that $\sin \left(\frac{B+C}{2} \right) = \cos \frac{A}{2}$
- 10) Prove the identity $(\operatorname{cosec} \theta - \cot \theta)^2 = \frac{1-\cos \theta}{1+\cos \theta}$
- 11) If $\sec x = 2$ then find $\cot x + \operatorname{cosec} x$
- 12) Evaluate. $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$
- 13) Evaluate. $2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$
- 14) Evaluate. $\cos 45^\circ / (\sec 30^\circ + \operatorname{cosec} 30^\circ)$
- 15) $(\sin 30^\circ + \tan 45^\circ - \operatorname{cosec} 45^\circ) / (\sec 30^\circ + \cos 60^\circ + \cot 45^\circ)$
- 16) Prove that $\sec A(1-\sin A)(\sec A + \tan A) = 1$

3 Marks / 4 Marks

- 1) A circus artist is climbing a 20 m long rope, which is tightly 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° .
- 2) 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.
- 3) 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.

13) STATISTICS

Find mean from following data.

Number of plants	0 - 2	2 - 4	4 - 6	6 - 8	8 - 10	10 - 12	12 - 14
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Number of houses	1	2	1	5	6	2	3
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1) Find the mean from the following data. **(Try these on your own)**

Number of heartbeats	65 - 68	68 - 71	71 - 74	74 - 77	77 - 80	80 - 83	83 - 86	per minute
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Number of women	2	4	3	8	7	4	2
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2) Find the mean from the following data.

Number of mangoes	50 - 52	53 - 55	56 - 58	59 - 61	62 - 64
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Number of Boxes	15	110	135	115	25
-----------------	----	-----	-----	-----	----

3) Find the mean from the following data.

Daily expenditure	100 - 150	150 - 200	200 - 250	250 - 300	300 - 350
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(in `) Number of households	4	5	1	2	2	2
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4) Find the mean from the following data

Concentration of SO ₂	0.00 - 0.04	0.04 - 0.08	0.08 - 0.12	0.12 - 0.16
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	0.16 - 0.20	0.20 - 0.24	2
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(in ppm)

Frequency	4	9	9	2	4	2
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5) Find the mean from the following data

Number of Days	0 - 6	6 - 10	10 - 14	14 - 20	20 - 28	28 - 38	38 - 40
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Number of

students	1	1	1	0	7	4	4	3	1
----------	---	---	---	---	---	---	---	---	---

6) Find the mean from the following data

Literacy rate (in %)	45 - 55	55 - 65	65 - 7	5	75 - 85	85 - 95
Number of cities	3	10	11	8	3	

4) 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

1) Find mode of the given data. (Try the following on your own)

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

2) Find the mode of the given data

Number of cars	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80						
Frequency	7	1	4	1	3	1	2	2	0	1	1	1	5	8

3) Find the mode of the following data.

Length (in mm)	118 - 126	127 - 135	136 - 144	145 - 153	154 - 162	163 - 171	172 - 180
Number of leaves	3	5	9	12	5	4	2

4) Find the mode of the following data.

Life time (in hours)	Number of lamps
1500 - 2000	14
2000 - 2500	56
2500 - 3000	60
3000 - 3500	86
3500 - 4000	74
4000 - 4500	62
4500 - 5000	48

5) Find the mode from the following data.

Weight (in kg)	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75
Number of students	2	3	8	6	6	3	2

5) Find median of the following data.

Marks	Number of students
0-10	5
10-20	3
20-30	4
30-40	3
40-50	3
50-60	4
60-70	7
70-80	9
80-90	7
90-100	8

(FIND THE MEDIAN FROM DATA) Try the following on your own

1) 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 :

Length (in mm)	Number of leaves
118 - 126	3
127 - 135	5
136 - 144	9
145 - 153	12
154 - 162	5
163 - 171	4
172 - 180	2

2) The following table gives the distribution of the lifetime of 400 neon lamps :
Find the median of life time of a lamp

Lifetime (in hours)	Number of lamps
1500 - 2000	14
2000 - 2500	56
2500 - 3000	60
3000 - 3500	86
3500 - 4000	74
4000 - 4500	62
4500 - 5000	48

Construct 'ogive' for the following distribution

Marks	Number of students
0 - 10	5
10 - 20	3
20 - 30	4
30 - 40	3
40 - 50	3
50 - 60	4
60 - 70	7
70 - 80	9
80 - 90	7
90 - 100	8

Try the following on your own

1) Construct 'ogive' for the following distribution

C.I	0-3	3-6	6-9	9-12	12-15
F	9	3	5	3	1

2) construct the ogive for the following distribution

Classes	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40
No. of shops	2	12	2	4	3	4	3

3)construct the ogive for the following distribution

Daily income (in `)	100 - 120	120 - 140	140 - 160	160 - 180	180 -200
Number of workers	12	14	8	6	10

4)construct the ogive for the following distribution

Weight (in kg)	Number of students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

5) construct the ogive for the following distribution

Production yield (in kg/ha)	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80
Number of farms	2	8	12	24	38	16

6) construct the ogive for the following distribution

Profit (` in lakhs)	Number of shops (frequency)
More than or equal to 5	30
More than or equal to 10	28

More than or equal to 15	16
More than or equal to 20	14
More than or equal to 25	10
More than or equal to 30	7
More than or equal to 35	3

7)construct the ogive for the following distribution

Classes	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40
No. of shops	2	12	2	4	3	4	3

14) PROBABILITY

2 Marks

- 1)A die is thrown once. Find the probability of getting a prime number;
- 2)A die is thrown once. Find the probability of getting a number lying between 2 and 6;
- 3)A die is thrown once. Find the probability of getting an odd number.
- 4)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.
- 5)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?
- 6)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 a two-digit number

7) 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 a perfect square number

1 Marks

(1) Probability of an event E + Probability of the event 'not E' = -----

(2) The probability of an event that cannot happen is----- . Such an event is called -----.

(3) The probability of an event that is certain to happen is----- . Such an event is called -----.

(4) The sum of the probabilities of all the elementary events of an experiment is-----.

(5) The probability of an event is greater than or equal to----- and less than or equal to----- .

(6) Which of the following cannot be the probability of an event?

(A) $\frac{2}{3}$ (B) -1.5 (C) 15% (D) 0.75.

Ans)-1.5 because $0 \leq p(E) \leq 1$

7) If $P(E) = 0.05$, what is the probability of 'not E'?

8) Probability of an event E + Probability of the event 'not E' is 1

9) The probability of an event that cannot happen is 0 . Such an event is called impossible event

10) The probability of an event that is certain to happen is 1 . Such an event is called sure event.

11) The sum of the probabilities of all the elementary events of an experiment is 1

12) The probability of an event is greater than or equal to 0 and less than or equal to 1

13) Which of the following cannot be the probability of an event?

(A) $\frac{2}{3}$ (B) -1.5 (C) 15% (D) 0.75.

14) If $P(E) = 0.05$, what is the probability of 'not E'?

2 Marks

1) Harpreet tosses two different coins simultaneously. What is the probability that she gets at least one head?

2) Harpreet tosses two different coins simultaneously. What is the probability that she gets at most one head?

3) 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 13?

4) 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 a lemon flavoured candy?

5) 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 not green?

Try the following on your own

1) 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 a number divisible by 5.

- 2) 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 She will buy it ?
- 3) 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 She will not buy it ?
- 4) 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.
- 5) A die is thrown twice. What is the probability that 5 will not come up either time?
- 6) A die is thrown twice. What is the probability that 5 will come up at least once?

15) SURFACE AREAS AND VOLUMES

1 mark

- 53) Write formula to find Volume of the frustum of the cone is —
- 54) write the formula to find the curved surface area of the frustum of the cone
- 55) write the formula to find the total surface area of the frustum of the cone

2 marks questions

1) 2 cubes each of volume 64 cm^3 are joined end to end. Find the surface area of the resulting cuboid.

4 Marks / 5 Marks

2) 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.

3) A hemispherical depression is cut out from one face of a cubical wooden block such that the diameter of the hemisphere is equal to the edge of the cube. Determine the surface area of the remaining solid

4) From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm^2 .

5) A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π

6) A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm. Find the volume of wood in the entire stand (see Fig)

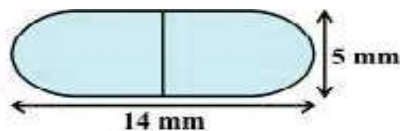
7) A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel

- 8) A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm
- 10) A spherical glass vessel has a cylindrical neck 8 cm long, 2 cm in diameter; the diameter of the spherical part is 8.5 cm. By measuring the amount of water it holds, a child finds its volume to be 345 cm^3 . Check whether she is correct, taking the above as the inside measurements, and $\pi = 3.14$
- 11) 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.
- 12) Metallic spheres of radii 6 cm, 8 cm and 10 cm, respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere.
- 13) 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.
- 14) How many silver coins, 1.75 cm in diameter and of thickness 2 mm, must be melted to form a cuboid of dimensions $5.5 \text{ cm} \times 10 \text{ cm} \times 3.5 \text{ cm}$?
- 15) 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

- 16) A drinking glass is in the shape of a frustum of a cone of height 14 cm. The diameters of its two circular ends are 4 cm and 2 cm. Find the capacity of the glass
- 17) The slant height of a frustum of a cone is 4 cm and the perimeters (circumference) of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum
- 18) A fez, the cap used by the Turks, is shaped like the frustum of a cone. If its radius on the open side is 10 cm, radius at the upper base is 4 cm and its slant height is 15 cm, find the area of material used for making it

4 Marks / 5 Marks

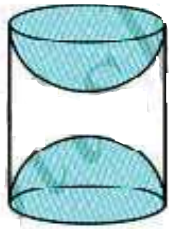
- 1) A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel
- 2) A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.
- 3) A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends (see Fig.). The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area.



- 4) A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used

for making the tent. Also, find the cost of the canvas of the tent at the rate of ₹ 500 per m^2 . (Note that the base of the tent will not be covered with canvas.)

- 5) A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in Fig.. 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



- 6) Rachel, an engineering student, was asked to make a model shaped like a cylinder with two cones attached at its two ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its length is 12 cm. If each cone has a height of 2 cm, find the volume of air contained in the model that Rachel made. (Assume the outer and inner dimensions of the model to be nearly the same.)
- 7) A gulab jamun, contains sugar syrup up to about 30% of its volume. Find approximately how much syrup would be found in 45 gulab jamuns, each shaped like a cylinder with two hemispherical ends with length 5 cm and diameter 2.8 cm (see Fig.)
- 8) 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

- 9) A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in her field, which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/h, in how much time will the tank be filled
- 10) A container, opened from the top and made up of a metal sheet, is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm, respectively. Find the cost of the milk which can completely fill the container, at the rate of ₹ 20 per litre. Also find the cost of metal sheet used to make the container, if it costs ₹ 8 per 100 cm². (Take $\pi = 3.14$)
- 11) A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter 1 cm, find the length of the wire.
