

FARJAN
AHMED
Class 9th
Roll no 12

GYAN BHARATI SCHOOL
Half Yearly Examination (2024-25)
Mathematics
Class- S1



Marks: 80


Time: 3 Hrs

General Instructions:

1. This Question Paper has 38 Questions.
2. This Question Paper contains 5 Sections A, B, C, D and E and total 6 pages
3. Section A has 20 MCQs carrying 1 mark each including 2 assertion- reason questions.
4. Section B has 5 questions carrying 02 marks each.
5. Section C has 6 questions carrying 03 marks each.
6. Section D has 4 questions carrying 05 marks each.
7. Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E

Section A

1. The rationalizing factor for the denominator of $\frac{1}{\sqrt{7} + \sqrt{6}}$ is 1
 - (a) $\sqrt{7} + \sqrt{6}$
 - (b) $\sqrt{7} - \sqrt{6}$
 - (c) $\sqrt{7}\sqrt{6}$
 - (d) 0
2. The equation $x = 7$, in two variables, can be written as 1
 - (a) $1.x + 1.y = 7$
 - (b) $1.x + 0.y = 7$
 - (c) $0.x + 1.y = 7$
 - (d) $0.x + 0.y = 7$
3. If $x + y = 10$, then $x + y + z = 10 + z$. Euclid's axiom that illustrates this statement is: 1
 - (a) Things which coincide with one another are equal to one another.
 - (b) If equals are added to equals then wholes are equal.
 - (c) If equals are subtracted from equals then the remainders are equal.
 - (d) Only one line can pass through a single point.
4. The degree of the polynomial $x(x^2 + 2x - 4) = 2x$ is 1
 - (a) 3
 - (b) 4
 - (c) 2
 - (d) 1
5. If the point $(3, a - 3)$ lies on the x-axis, then the value of a is: 1
 - (a) 0
 - (b) 3
 - (c) 2
 - (d) - 6

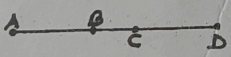
6. If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio 2 : 3, then the measure of the larger angle is
 (a) 84°
 (b) 120°
 (c) 108°
 (d) 136°
7. Which of the following is not irrational?
 (a) $3 - 4\sqrt{5}$
 (b) $\sqrt{7} - \sqrt{6}$
 (c) $2 + 2\sqrt{9}$
 (d) $4\sqrt{11} - 8$
8. Ordinate of all points on the x-axis is
 (a) 0
 (b) 1
 (c) -1
 (d) any number
9. In the given figure, if $\angle PTR = 50^\circ$, then $\angle PTS + \angle RTQ =$
 (a) 100°
 (b) 140°
 (c) 260°
 (d) 130°
- 
10. Which of the following statements is true?
 (a) Only one line can pass through a single point.
 (b) There is an infinite number of lines that pass through two distinct points.
 (c) A terminated line can be produced indefinitely on both sides.
 (d) A circle cannot be drawn with any centre and any radius.
11. The point at which the two coordinate axes meet is called the
 (a) abscissa
 (b) ordinate
 (c) origin
 (d) quadrant
12. If $(2, 1)$ is a solution of the linear equation $2x + 3y = k$, then the value of k is
 (a) 4
 (b) 6
 (c) 7
 (d) 2
13. Every point on a number line represents
 (a) a unique real number.
 (b) a natural number.
 (c) a rational number.
 (d) an irrational number.
14. In two triangles ABC and DEF, $AB = DE$, $BC = DF$ and $AC = EF$, then
 (a) $\triangle ABC \cong \triangle DEF$
 (b) $\triangle ABC \cong \triangle EFD$
 (c) $\triangle ABC \cong \triangle FDE$
 (d) $\triangle CAB \cong \triangle FED$

intersecting two parallel lines are in the

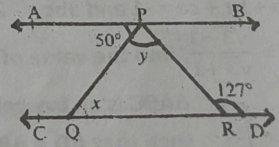
- 15 If $p(x) = x^3 - x^2 + x + 1$, the value of $p(-1) + p(1)$ is
 (a) -1
 (b) 0
 (c) 1
 (d) 2
- 16 In a ΔABC , if $BC = AB$ and $\angle B = 80^\circ$, then $\angle A =$
 (a) 80°
 (b) 50°
 (c) 40°
 (d) 100°
- 17 If $x^2 + kx + 6 = (x + 2)(x + 3)$ for all x , find the value of k .
 (a) -1
 (b) 1
 (c) 3
 (d) 5
- 18 Which of the following equation has graph parallel to y-axis?
 (a) $y = -2$
 (b) $x = 1$
 (c) $x - y = 2$
 (d) $x + y = 2$
- 19 Assertion (A) : In ΔABC , $\angle C = \angle A$, $BC = 4$ cm and $AC = 5$ cm. Then, $AB = 4$ cm.
 Reason (R) : In a triangle, angles opposite to two equal sides are equal.
 (a) Both (A) and (R) are true and (R) is the correct explanation for (A).
 (b) Both (A) and (R) are true and (R) is not the correct explanation for (A).
 (c) (A) is true but (R) is false.
 (d) (A) is false but (R) is true
- 20 Assertion (A) : If angles 'a' and 'b' form a linear pair of angles and $a = 40^\circ$, then $b = 140^\circ$.
 Reason (R) : Sum of linear pair of angles is always 250° .
 (a) Both (A) and (R) are true and (R) is the correct explanation for (A).
 (b) Both (A) and (R) are true and (R) is not the correct explanation for (A).
 (c) (A) is true but (R) is false.
 (d) (A) is false but (R) is true.

Section B

- 21 Factorize : $a^3 - 27$ 2
- 22 In the given figure, if $AC = BD$, then prove that $AB = CD$. Write the axiom used. 2



- 23 In the following figure, if $AB \parallel CD$, $\angle APQ = 50^\circ$ and $\angle PRD = 127^\circ$, find x and y . 2



Or

If angles a and b are supplementary angles and $a > b$ by one-sixth of a straight angle, find a and b .

24 In which quadrant or on which axis will the following points lie?

- (a) (-3, 5)
- (b) (2, 0)
- (c) (2, 2)
- (d) (-3, -6)

25 The taxi fare in a city is as follows: For the first kilometer, the fare is ₹ 7 and for the subsequent distance it is ₹ 5 per km. Taking the distance as x km and total fare as ₹ y , write a linear equation for this information.

Or

If the point (-1, 2) lies on the graph of the equation $3x + 4y = p$, then find the value of p .

Section C

26 Express $0.2\overline{35}$ in the form of $\frac{p}{q}$.

Or

Find the value of A and B: $\frac{3+\sqrt{7}}{3-\sqrt{7}} = A + B\sqrt{7}$

27 Plot the points A (2, 5), B (-2, 2) and C (4, 2) on graph paper. Join AB, BC and AC. Calculate the area of ΔABC .

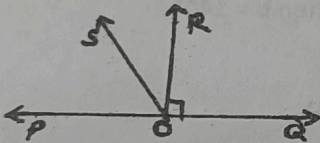
28 If $3x + 2y = 12$ and $xy = 6$ find the value of $27x^3 + 8y^3$.

Or

Factorize : $x^3 - 2x^2 - x + 2$

29 In an isosceles triangle ABC, with $AB = AC$, the bisectors of $\angle B$ and $\angle C$ intersect each other at O. Join A to O. Show that: (i) $OB = OC$ (ii) AO bisects $\angle A$.

30 In the following fig., POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that $\angle ROS = \frac{1}{2} (\angle QOS - \angle POS)$.



31 Determine the point on the graph of the equation $2x + 5y = 20$ whose ordinate is $\frac{2}{5}$ times its abscissa. Find one more solution of the above equation.

Section D

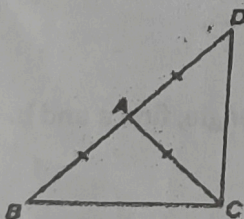
32 If $x = 3 + 2\sqrt{2}$, find the value of $x^3 - \frac{1}{x^3}$.

Or

If $a + b + c = 2$, $ab + bc + ca = -1$ and $abc = -2$, find the value of $a^3 + b^3 + c^3$.

33 If $x = \frac{\sqrt{3}+1}{\sqrt{3}-1}$ and $y = \frac{\sqrt{3}-1}{\sqrt{3}+1}$, find the value of $x^2 - xy + y^2$.

34 ΔABC is an isosceles triangle in which $AB = AC$. Side BA is produced to D such that $AD = AB$ (see figure). Show that $\angle BCD$ is a right angle.



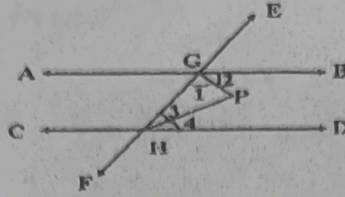
Or

Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of triangle PQR. Show that

(i) $\Delta ABM \cong \Delta PQN$

(ii) $\Delta ABC \cong \Delta PQR$

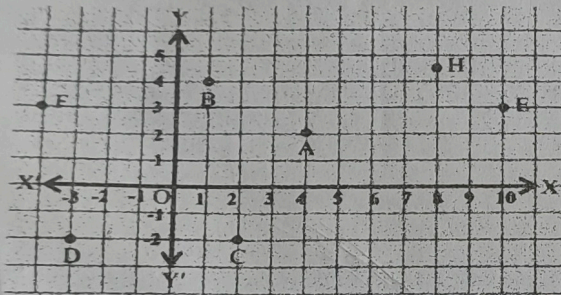
In the given figure, AB and CD are parallel lines. The bisector of the interior angles on the same side of the transversal EF intersect at P. Prove that $\angle GPH = 90^\circ$.



Section E

36 Case Based Questions:

Students of class 9th are on a visit of Sansad Bhavan. Teacher assigns them an activity to observe and take some pictures to analyse the seating arrangement between various MPs and speaker, based on co-ordinate geometry. The staff tour guide explains various facts, related to maths, of Sansad Bhavan to the students. Students were surprised when teacher asked them to apply co-ordinate geometry on the seating arrangement of MP's and speaker.



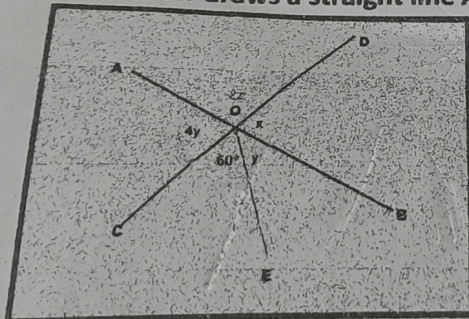
Based on the above information, answer the following questions:

- a) What is the coordinate of E? 1
- b) What is the ordinate of B? 1
- c) Find abscissa of D + Ordinate of H. 2

Or

Find the perpendicular distance of the point D from the y-axis and C from x-axis.

37 Maths teacher draws a straight line AB on the blackboard as per the given figure. Then he tells Raju to draw another line CD. The teacher told Ajay to mark $\angle AOD$ as $2z$. Suraj was told to mark $\angle AOC$ as $4y$. Clive made $\angle COE = 60^\circ$. Peter marked $\angle BOE$ and $\angle BOD$ as y and x respectively.



Based on the above information, answer the following questions:

- a) What is the value of y ?
- b) Find x .
- c) Find the value of $x + 2z$.

Or

What is the relation between y and z ?

38

One day, the principal of a particular school visited the classroom. The class teacher was teaching the concept of polynomials to the students. He was very much impressed by the way of teaching. To check whether the students also understand the concept taught by her or no

asked various questions to the students.

Based on the above information, answer the following questions:

a) Which one of the following is not a polynomial?

i) $4x^2 + 2x - 1$

ii) $y + \frac{3}{y}$

iii) $x^3 - 1$

iv) $y^2 + 5y + 1$

1

b) The polynomial of the type $ax^2 + bx + c$, $a \neq 0$ is called _____

1

c) What is the value of k , if $(x - 1)$ is a factor of $4x^3 + 3x^2 - 4x + k$?

2

Or

Factorise: $2y^2 - 7y - 15$
