

O. P. JINDAL SCHOOL, SAVITRI NAGAR
Half Yearly Examination - (2023 – 2024)

Class: IX
Subject: Mathematics
Name: _____

MM: 80
Time: 3Hrs.
Roll No.: _____

(Fifteen Minutes Extra will be given for reading the Question Paper.)

General Instructions:

- i. This question paper contains 38 questions. All questions are compulsory.
- ii. This question paper is divided into 5 sections – Sections A,B,C,D and E.
- iii. Section A comprises 20 questions (Q. no.1 to 20) of 1 mark each.
- iv. Sections B comprises 5 questions (Q. no.21 to 25) of 2 marks each.
- v. Section C comprises 6 questions (Q. no.26 to 31) of 3 marks each.
- vi. Section D comprises 4 questions (Q. no.32 to 35) of 5 marks each.
- vii. Section E comprises 3 questions (Q. no.36 to 38) of case study based carrying 4 marks each.
- viii. There is no overall choice. However an internal choice has been provided. You have to attempt only one of the alternatives in all such questions.
- ix. Use of calculator is not allowed.

Section A

Choose the correct option:

Q1. Which of the following is equal to x^3 ?

- a) $x^6 - x^3$ b) $x^6 \cdot x^3$ c) x^6/x^3 d) $(x^6)^3$

OR

$\sqrt{6} \times \sqrt{27}$ is equal to:

- a) $9\sqrt{2}$ b) $3\sqrt{3}$ c) $2\sqrt{2}$ d) $9\sqrt{3}$

Q2. Which graph is parallel to x-axis?

- a) $y = x+1$ b) $y = 2$ c) $x = 3$ d) $x = 2y$

Q3. $5 + \sqrt{5}$ is:

- a) an irrational number b) a positive rational number
c) a negative rational number d) an integer

Q4. In two triangles, ABC and PQR, $\angle A = 30^\circ$, $\angle B = 70^\circ$, $\angle P = 70^\circ$, $\angle Q = 80^\circ$ and $AB = RP$, then

- a) $\triangle ABC \cong \triangle PQR$ b) $\triangle ABC \cong \triangle QRP$
c) $\triangle ABC \cong \triangle RPQ$ d) $\triangle ABC \cong \triangle RQP$

- Q5. The value of the polynomial $7x^4 + 3x^2 - 4$, when $x = -2$ is:
a) 120 b) 100 c) 130 d) 110

OR

If $x^2 + kx + 6 = (x+2)(x+3)$ for all k , find the value of k .

- a) -1 b) 5 c) 6 d) 1
- Q6. If $x^{67} + 67$ is divided by $(x + 1)$, the remainder is:
a) 67 b) 132 c) 0 d) 66
- Q7. Which one of the following is a polynomial?
a) $x^2 - 3x + \frac{1}{x}$ b) $\sqrt{z} - 2z + 8$ c) $3\sqrt{t} + t\sqrt{2}$ d) $y^3 - 2\sqrt{3}$

OR

Find the value of $(a^2 + b^2)$, if $a + b = 10$ and $ab = 16$

- a) 32 b) 68 c) 100 d) 10
- Q8. Which of the following is the zero polynomial?
a) 0 b) $0x^3 + 0x$ c) $x^3 + 5$ d) both a and b
- Q9. The decimal representation of the rational number is
a) always terminating b) either terminating or repeating
c) either terminating or non-repeating d) neither terminating nor repeating

- Q10. If the points A(2, 0), B(-6, 0) and C(2, a - 4) lie on the x-axis, then the value of 'a' is:
a) -2 b) 0 c) 4 d) -4

OR

If $(x + 2, 4) = (5, y - 2)$ then coordinates (x, y) are

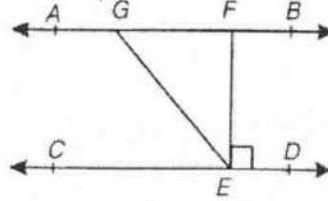
- a) (3, 6) b) (6, 3) c) (2, 1) d) none of these
- Q11. Which of the following statement is true?
a) Only one line can pass through a single point.
b) There is an infinite number of lines that pass through two distinct points.
c) A terminated line can be produced indefinitely on both sides
d) If two circles are equal, then their radii are unequal.

- Q12. A rational number between $\frac{1}{7}$ and $\frac{2}{7}$ is:

- a) $\frac{2}{21}$ b) $\frac{1}{14}$ c) $\frac{5}{21}$ d) $\frac{5}{14}$

- Q13. In a triangle PQR if $\angle QPR = 80^\circ$ and $PQ = PR$, then $\angle R$ and $\angle Q$ are
a) $80^\circ, 70^\circ$ b) $80^\circ, 80^\circ$ c) $70^\circ, 80^\circ$ d) $50^\circ, 50^\circ$

Q14. If $AB \parallel CD$, $EF \perp CD$ and $\angle GED = 135^\circ$ in the given diagram, the value of $\angle AGE$ is:



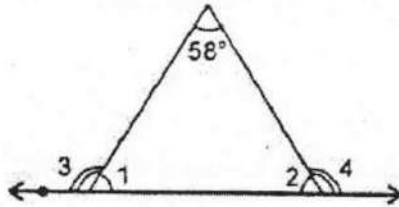
- a) 120° b) 140° c) 90° d) 135°

OR

If one pair of the corresponding angles formed by two parallel and one transversal lines are $(3x-5)^\circ$ and $(2x+17)^\circ$ then find x .

- a) 40 b) 22 c) 20 d) 18

Q15. In the given figure, $\angle 1 = \angle 2$ then the measurements of $\angle 3$ and $\angle 4$ are:



- a) $58^\circ, 61^\circ$ b) $61^\circ, 61^\circ$ c) $119^\circ, 61^\circ$ d) $119^\circ, 119^\circ$

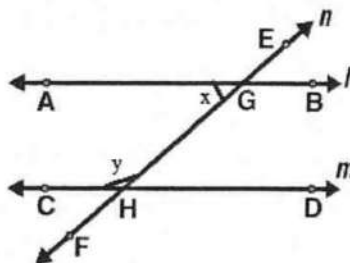
OR

Two angles of a triangle are in the ratio 1: 3. Exterior angle of the third interior angle is 80° . Find the value of interior opposite angles.

- a) $40^\circ, 120^\circ$ b) $30^\circ, 60^\circ$ c) $20^\circ, 60^\circ$ d) $90^\circ, 60^\circ$

Q16. In the given figure, $l \parallel m$ and line n is transversal, if angles x and y are in the ratio 2:3, then smaller angle is:

- a) 108° b) 72° c) 36° d) none of these



Q17. In triangles ABC and PQR, $AB = AC$, $\angle C = \angle P$ and $\angle B = \angle Q$. The two triangles are:

- a) Isosceles but not congruent b) Isosceles and congruent
c) Congruent but not isosceles d) Neither congruent nor isosceles

Q18. If $\triangle ABC \cong \triangle XYZ$ then which of the following is not true?

- a) $AB = XZ$ b) $BC = YZ$ c) $AC = XZ$ d) none of these

Directions: In the following questions a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

- a) Both assertion (A) and reason(R) are true and reason (R) is correct explanation of assertion (A).
b) Both assertion (A) and reason(R) are true and reason (R) is not the correct explanation of assertion (A).
c) Assertion(A) is true but reason (R) is false.
d) Assertion(A) is false but reason (R) is true.

Q19. Assertion : There are infinite number of lines which passes through (3, 2).

Reason: A linear equation in two variables has infinitely many solutions.

Q20. Assertion : Angles opposite to equal sides of a triangle are not equal.

Reason : Sides opposite to equal angles of a triangle are equal.

Section B

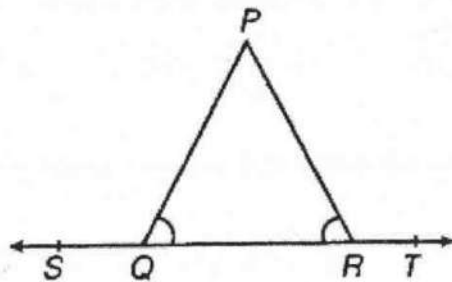
Answer the following questions:

Q21. If a point C lies between two points A and B such that $AC = BC$, then prove that $AC = \frac{1}{2} AB$. Explain by drawing the figure.

OR

Write any two postulates of Euclid.

Q22. In the given figure, $\angle PQR = \angle PRQ$, then prove that $\angle PQS = \angle PRT$.



Q23. Express $4.\overline{23}$ in the form of p/q .

OR

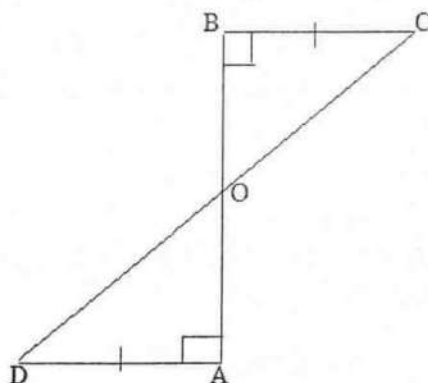
Simplify: $(3 + \sqrt{3})(2 + \sqrt{2})$

Q24. Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by $(x + 2)$.

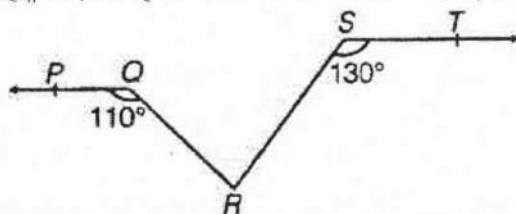
Q25. Prove that angles opposite to equal sides of an isosceles triangle are equal.

Section C

Q26. AD and BC are equal perpendiculars to a line segment AB (see figure). Show that CD bisects AB.

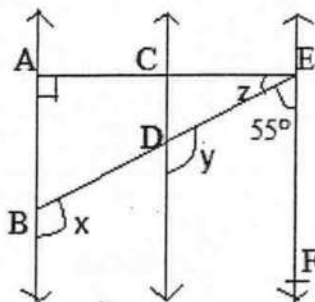


Q27. In the given figure, if $PQ \parallel ST$, $\angle PQR = 110^\circ$ and $\angle RST = 130^\circ$, find $\angle QRS$.



OR

In the given figure, $AB \parallel CD$ and $CD \parallel EF$. Also $EA \perp AB$, If $\angle BEF = 55^\circ$, find the values of x, y & z



Q28. Write the five solutions of the graph of the linear equation $2x + y = 3$ in two variables.

Q29. Factorise: $8a^3 - b^3 - 12a^2b + 6ab^2$

Q30. Evaluate the value of $(102)^3$ by using suitable identity.

OR

Find the value of k , if $(x - 1)$ is a factor of $p(x)$.

$$p(x) = x^2 - 2kx + \sqrt{3}$$

Q31. Represent $\sqrt{9.3}$ on number line.

Section D

Q32. Find the values of a & b if $\frac{3+\sqrt{2}}{3-\sqrt{2}} = a + b\sqrt{2}$

OR

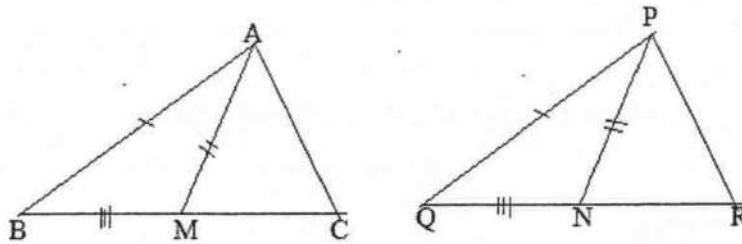
Represent $\sqrt{2}$ and $\sqrt{3}$ separately on two different number lines.

Q33. Factorise: $x^3 - 3x^2 - 9x - 5$

Q34. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of ΔPQR . Show that:

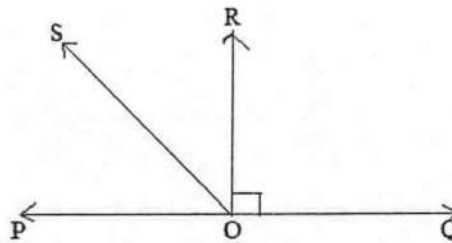
(i) $\Delta ABM \cong \Delta PQN$

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



Q35. In figure, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that:

$$\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$$

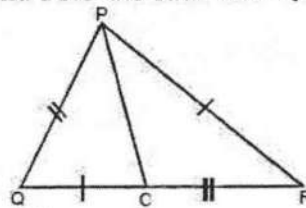


Section E

Case-Study Based Questions:

Question number 36 to 38 is case-Study based, read the questions and answer any 4 parts.

Q36. In the given figure, triangles PQC and PRC are such that $QC = PR$ and $PQ = CR$.



(i) $\Delta PQC \cong \Delta CRP$ by which criteria?

a) SSS

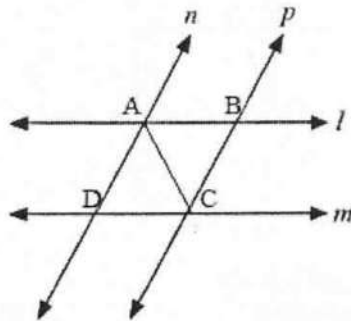
b) ASA

c) SAS

d) RHS

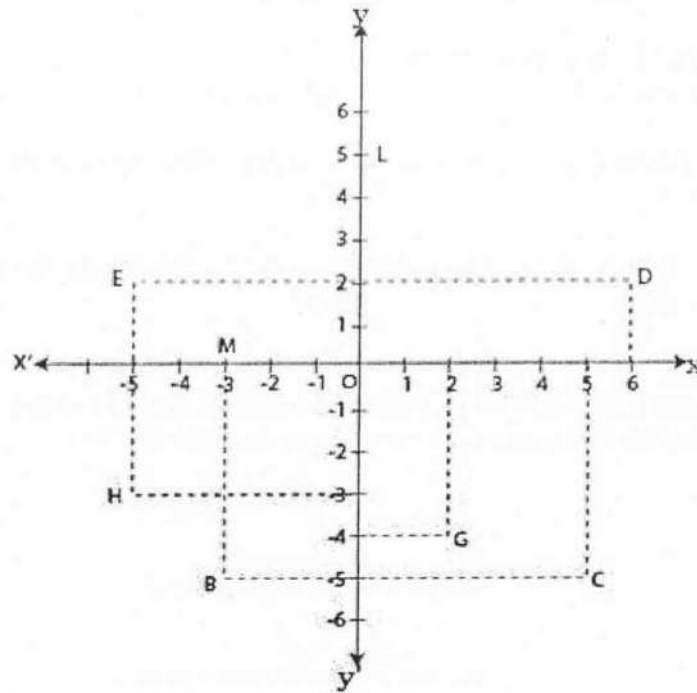
- (ii) $\angle PCR = ?$
 a) $\angle PQR$ b) $\angle RCP$ c) $\angle QPC$ d) none of these
- (iii) What is H in criteria RHS?
 a) Angle b) Hypotenuse c) side d) none of these
- (iv) If ΔPQR is an isosceles triangle and $PQ = QR$, $\angle Q = 70^\circ$, then find $\angle QRP$.
 a) 30° b) 70° c) 110° d) 55°
- (v) If ΔPQR is an equilateral triangle and PC is its altitude, then $QC = ?$
 a) PQ b) PR c) RC d) QR

Q37. A farmer has a field ABCD formed by two pairs of parallel roads as shown below in which $l \parallel m$ and $n \parallel p$. He tied his four cows at four corners of the field ABCD.



- (i) If $\angle BAC = 30^\circ$ then find $\angle DCA$.
 a) 45° b) 30° c) 90° d) none of these
- (ii) $\angle ABC + \angle BCD = 180^\circ$ as
 a) Alternate interior angles are supplementary.
 b) Corresponding angles are supplementary.
 c) Alternate exterior angles are supplementary.
 d) Interior angles on the same side of transversal are supplementary.
- (iii) If cow at C and cow at B is 2 km apart, then what is the distance between cow at A and cow at D.
 a) 1km b) 3km c) 2km d) 4km
- (iv) If $\angle D = 60^\circ$, then $\angle B = ?$
 a) 60° b) 45° c) 120° d) 90°
- (v) If we join BD such that BD meets AC at O and $\angle BOC = 30^\circ$, then what is the measure of $\angle AOD$?
 a) 90° b) 45° c) 30° d) none of these

Q38. From the given figure answer the following questions.



- (i) The point identified the coordinates $(-3, -5)$.
 a) Point D b) Point B c) Point C d) Point M
- (ii) The coordinates of point L.
 a) $(5, 0)$ b) $(-3, 0)$ c) $(0, 0)$ d) $(0, 5)$
- (iii) The coordinates of point E.
 a) $(-5, 2)$ b) $(2, -5)$ c) $(5, -5)$ d) $(0, 0)$
- (iv) Distance of point D from y-axis.
 a) 2 units b) 4 units c) 5 units d) none of these
- (v) Abscissa of point G.
 a) 4 b) 5 c) 2 d) 3
