PRINCE PUBLIC SCHOOL
HALF YEARLY EXAMINATION (2018-19)
SAMPLE PAPER-2
MATHEMATICS
IX

TIME ALLOWED: 3 HOURS **MAXIMUM MARKS: 80**

General Instructions.

1. **This question paper consists of 30 questions.**
2. **All questions are compulsory.**
3. **Question 1-6 in Section A are very short answer type questions carrying 1 mark each.**
4. **Question 7-12 in Section B are short answer type - I questions carrying 2 marks each.**
5. **Question 13-22 in Section C are short answer type-II questions carrying 3 marks each.**
6. **Question 23-30 in Section D are long answer type questions carrying 4 marks each.**
7. **There is no overall choice. However, internal choice has been provided. You have to attempt only one of the alternatives in all such questions.**
8. **Use of calculator is not allowed.**

SECTION- A

Q1. Simplify $\sqrt[12]{(x^4)^{\frac{1}{3}}}$.

Q2. Find the value of $p\left(-\frac{2}{3}\right)$ for $p(y) = 2y^3 - y^2 - 13y - 6$.

Q3. The base BC of an equilateral triangle ABC with side $BC = 2a$ lie along y-axis such that the mid point of the base is at origin. Find the coordinates of B and C.

Q4. Angles of a triangle are in the ratio 3:4:5. Find the largest angle of the triangle.

Q5. If the ratio between two complementary angles is 2:3, then find the angles.

Q6. It is known that if $a = 2b$ and $c = 2b$, then $a = c$. Which Euclid's axiom illustrates this statement?

SECTION –B

Q7. If $x = 0.027$, then find $\left(\frac{1}{x}\right)^{\frac{1}{3}}$.

Q8. If $x + 2k$ is a factor of $f(x) = x^5 - 4k^2x^3 + 2x + 2k + 3$, find k.

Q9. In fig.1, ABC is an equilateral triangle. The coordinates of vertices B and C are $(3, 0)$ and $(-3, 0)$ respectively. Find the coordinates of its vertex A.

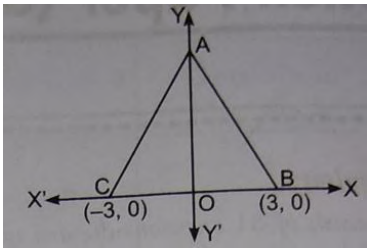

fig. 1

Q10. Find the coordinates of a point which

a) lies on x-axis and is at a distance of 2 units to the left of origin.

b) lies on y-axis and is at a distance of 4 units above origin.

Q11. If the area of an equilateral triangle is $16\sqrt{3}\ cm^2$, then find the perimeter of the triangle.

Q12. Prove that every line segment has one and only one mid-point.

SECTION –C

Q13. Simplify $\frac{\sqrt{25}}{\sqrt[3]{64}} + \left(\frac{256}{625}\right)^{-1/4} + \frac{1}{\left(\frac{64}{125}\right)^{2/3}}$.

Q14. Simplify by rationalizing the denominator $\frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{48}+\sqrt{18}}$.

Q15. If $x + \frac{1}{x} = 3$, find the value of $x^4 + \frac{1}{x^4}$.

Q16. Factorise $x^3 + 3x^2y + 3xy^2 + y^3 - 8$.

Q17. Write the coordinates of the vertices of a rectangle whose length and breadth are 6 and 3 units respectively, one vertex at the origin, the longer side lies on the y-axis and one of the vertices lies in the second quadrant.

Q18. The sides of a triangular field are 41 m, 40 m and 9 m. Find the number of rose beds that can be prepared in the field, if each rose bed on an average needs 900 cm^2 space.

Q19. During Van Mahotsav, some children planted trees in a triangular region, two sides of which are 18 m and 10 m and the perimeter is 42 m. Find the area of planted region.

Q20. If a point O lies between two points P and R such that $PO = OR$ then prove that $PO = \frac{1}{2}PR$

Q21. In fig. 2, if $AB \parallel CD$, then find the value of x.

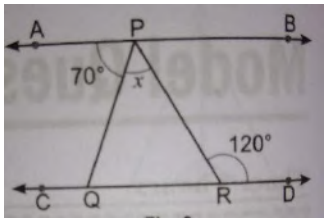

fig. 2

Q22. In fig. 3, T is a point on side QR of ΔPQR and S is a point such that $RT = ST$, Prove that $PQ + PR > QS$.

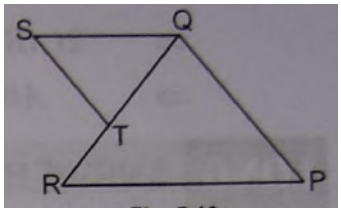

fig. 3

SECTION- D

Q23. If $a = \frac{1}{7-4\sqrt{3}}$ and $b = \frac{1}{7+4\sqrt{3}}$, then find the value of

a) $a^2 + b^2$ **b)** $a^3 + b^3$

Q24. If $x^3 + mx^2 - x + 6$ has $(x - 2)$ as a factor, and leaves a remainder n when divided by $(x - 3)$, find the values of m and n.

Q25. If the polynomials $az^3 + 4z^2 + 3z - 4$ and $z^3 - 4z + a$ leave the same remainder when divided by $z - 3$, find the value of a.

Q26. Some triangular posters were prepared by the people working for 'Say No to Plastic' campaign. Prove that if in two posters, two angles and the included side of one triangle are equal to two angles and the included side of the other triangle, then the two triangles are congruent. Which values are depicted in the campaign ?

Q27. If the bisector of angles $\angle B$ and $\angle C$ of a triangle ABC meet at a point O, then prove that $\angle BOC = 90° + \frac{1}{2}\angle A$.

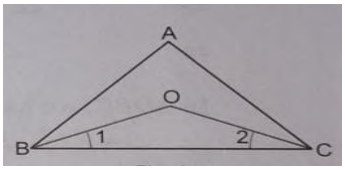

fig. 4

Q28. In fig. 5, $ABCD$ is a square and EF is parallel to diagonal BD and $EM = FM$.Prove that

a) $DF = BE$ **b)** AM bisects $\angle BAD$.

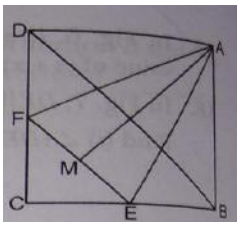

fig. 5

Q29. Ashwin was asked to paint a triangular portion of a wall in three different colours. He divided the portion as shown in fig. 6. If $AB = AC$, D is a point in the interior of ΔABC such that $\angle DBC = \angle DCB$. Prove that AD bisects $\angle BAC$ of ΔABC. When Ashwin started painting his two friends joined him and each one of them completed one colour. How is team work helpful?

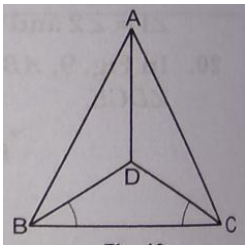

fig. 6

Q30. In fig 7 the side QR of ΔPQR is produced to point S. If the bisector of $\angle PQR$ and $\angle PRS$ meet at point T, then prove that $\angle QTR = \frac{1}{2}\angle PQR$.

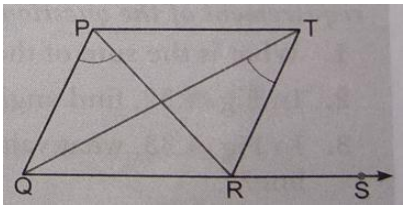

fig. 7