OLIVE INTERNATIONAL SCHOOL, QATAR

Academic Year 2023 - 2024
Annual Examination
MATHEMATICS (041)

Grade: 9   **Max. Marks: 80**

Date: 25.02.2024   **Duration: 3Hrs**

	General Instructions:
i.	This Question Paper has 5 Sections A-E. All questions are compulsory.
ii.	Section A has 20 MCQs carrying 1 mark each.
iii.	Section B has 5 questions carrying 02 marks each.
iv.	Section C has 6 questions carrying 03 marks each
v.	Section D has 4 questions carrying 05 marks each.
vi.	Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
vii	Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION-A

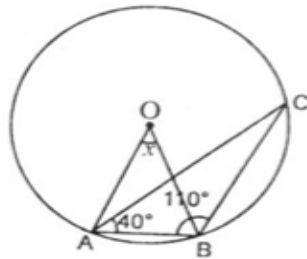**I. Choose the correct answer.**   **(20 x 1 = 20)**

1. The point (-1,-4) lies in :

   a) I quadrant   b) II quadrant   c) III quadrant   b) IV quadrant

2. In the given figure, O is the centre of the circle. If $\angle CAB = 40°$ and $\angle CBA = 110°$ the value of x is :

   a) 30^0 b) 60^0 c) 70^0 d) 40^0

3. How many lines pass through one point?

   a) One   b) two   c) three   d) many

4. The TSA of a cone of radius r and slant height l is:

   a) $\pi r(l + r)$ b) $\pi r\left(l + \frac{r}{4}\right)$ c) $\pi r\left(l + \frac{r}{2}\right)$ d) $\pi r\left(2l + \frac{r}{2}\right)$

5. The degree of the zero polynomial is:

   a) 0   b) 1   c) 2   d) not defined.

6. The ordinate of any point on the x-axis.

   a) 0   b) 1   c) any point   d) none of these.

7. Express y in terms of x in the equation $3x + y = 5$.

   a) y = 5-3x   b) y = 3x-5   c) y = 5 +3x   d) y = 5 + x

8. If $p(x) = 5x^2 - 4x + 3$ then $p(1) =$

   a) 12   b) 1   c) 4   d) 0

9. The total surface area of a hemisphere of radius r is :

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

10. The sides of a triangle are in the ratio of 3:5: 7 and its perimeter is 300 m. Then the length of the longest side is:

    a) 60m   b) 100m   c) 140m   d) 200m

11. If a solid sphere of radius r is melted and cast into the shape of a solid cone of height r, then the radius of the base of the cone is:

    a) 3r   b) 2r   c) r   d) 4r

12. The sum of either pair of opposite angles of a cyclic quadrilateral is :

    a) 180º   b) 90º   c) 360º   d) 100º

13. In Δ ABC, AD is the perpendicular bisector of BC, then Δ ABC is :

    a) an isosceles triangle   b) a right triangle   c) an equilateral triangle   d) none of these.

14. The radius of a sphere whose surface area is 154 cm^2

    a) 49cm   b) 7cm   c) 14cm   d) 3.5cm

15. The equation y = 3x + 5 has :

    a) a unique solution   b) only two solutions   c) infinitely many solutions   d) none of these.

16. In the adjoining figure, ∠ B =∠ C and AD⊥ BC. The rule by which △ABD≅△ADC:
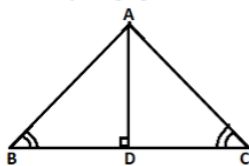
    a) SSS   b) SAS   c) RHS   d) AAS

17. Which of the following is the class-mark of the class interval 140 – 150?

    a) 140   b) 150   c) 145   d) 290

18. Multiply $6\sqrt{5} \times 2\sqrt{5}$:

   a) $12\sqrt{5}$ b) 30   c) 60   d) 12

ASSERTION-REASON BASED QUESTIONS

In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

   a) Both A and R are true and R is the correct explanation of A.

   b) Both A and R are true but R is not the correct explanation of A.

   c) A is true but R is false.

   d) A is false but R is true.

19. **Assertion (A):** $\sqrt{5}$ is an irrational number.

   Reason (R): Square root of a positive integer which is not a perfect square is an irrational number.

20. **Assertion (A):** For all values of k, $(\frac{-3}{2}, k)$ is a solution of the linear equation $2x + 3 = 0$.

   Reason (R): The linear equation $ax + b = 0$ can be expressed as a linear equation in two variables as $ax + y + b = 0$.
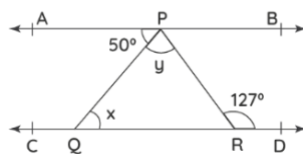
SECTION-B   (5x2=10)

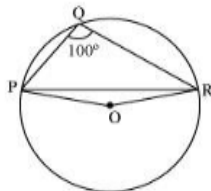21. Which of the following points lie on the i) x –axis ii) y-axis?

   A(1, 1), B(3, 0), C(0, 3), E(–5, 0), F(0, –1), G(9, 0), H(0, –8).

22. Simplify: $(\sqrt{5} - \sqrt{3})^2$

23. In the adjoining figure, if AB || CD, ∠ APQ = 50° and ∠ PRD = 127°, find x and y.

24. In Figure, ∠PQR = 100°, where P, Q and R, are points on a circle with centre O. Find ∠OPR.
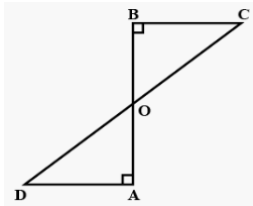

25. Give the possible expressions for the length and breadth of the rectangle if its area is $a^2 - a - 20$.

SECTION-C   (6x3=18)

26. Examine whether x + 2 is a factor of $x^3 + 3x^2 + 5x + 6$ and $2x + 4$.

27. AD and BC are equal perpendiculars to a line segment AB, from the figure show that CD bisects AB.

28. State whether the following statements are true or false. Give reasons for your answers.

    (i) Every natural number is a whole number.

    (ii) Every integer is a whole number.

    (iii) Every rational number is a whole number.

29. From the figure, the lines AB and CD intersect at O. If ∠ AOC + ∠ BOE = 70° and ∠ BOD = 40°, find ∠ BOE and reflex ∠ COE:
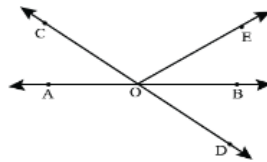
30. Simplify $\frac{\sqrt{25}}{\sqrt[3]{64}} + \left(\frac{256}{625}\right)^{\frac{-1}{4}} - \left(\frac{64}{125}\right)^{\frac{-1}{3}}$.

31. Prove that a diagonal of a parallelogram divides it into two congruent triangles.
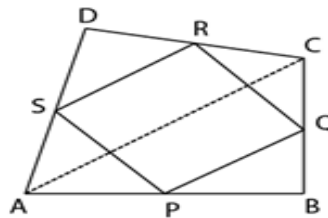
SECTION D   (4 x 5 =20)

32. Verify that $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$

33. Find three solutions for each of the following equations: i) 4x +3y = 12 ii) 3y + 4 = 0.

34. ABCD is a quadrilateral in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA. AC is a diagonal. Show that

    i) SR ∥ AC and SR = $\frac{1}{2}$ AC

    ii) PQ = SR

   iii) PQRS is a parallelogram

35. Consider the marks, out of 100, obtained by 51 students of a class in a test, given in the following table:

Marks	0-10	10 -20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	5	10	4	6	7	3	2	2	3	9

Draw a histogram and a frequency polygon corresponding to this frequency distribution table.

SECTION E (3x4=12)

36. A triangular park ABC has sides 120m, 80m and 50m. A gardener Seema has to put a fence all around it and also plant grass inside.
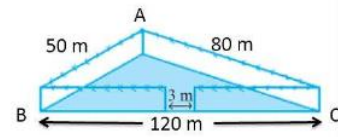

i) Write the formula for finding the area of the triangular park.

ii) How much area does she need to plant?

iii) Find the cost of fencing it with barbed wire at the rate of Rs.20 per metre leaving a space 3m wide for the gate on one side.

37. Read the text carefully and answer the questions: Sanjay and his mother visited in a mall. He observes that three shops are situated at P, Q, R as shown in the figure from where they have to purchase things according to their need. Distance between shop P and Q is 8 m and between shop P and R is 6m. Considering O as the center of the circle.
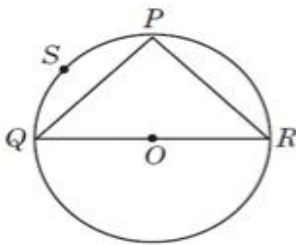
i) Find the measure of ∠QPR.

ii) Find the measure of ∠QSR.

iii) Find the radius of the circle.

38. For the annual sports day of Olive International School, grade 9 students are asked to make 20 hollow cones made of recycled cardboard. These cones are used as marking points in various sports events. Each cone has a base diameter of 30 cm and height 20cm. The outer side of each of the cone is to be painted.

i) Write the formula for finding CSA of a right circular cone.

ii) Find the CSA of one cone.

iii) If the cost of painting is QR.7 per m^2, what will be the cost of painting all these cones?