

PRUDENCE SCHOOL DWARKA 22
FINAL EXAMINATION
SESSION 2023-24

SUBJECT: MATHEMATICS
CLASS IX
SET A

Time Allowed: 3 hrs

Max. Marks: 80

Name of the Student: _____

Day & Date: Monday, 26.02.2024

General instructions

- The Question paper consists of 4 pages & 38 questions.
- Read question carefully and answer them accordingly.
- It is compulsory to attempt all the questions

SECTION A

Section A contains 20 Multiple Choice Questions.

- | | | |
|-----------|---|----------|
| 1 | The diagonals of a parallelogram ABCD, intersect at O. If $\angle BOC = 90^\circ$ and $\angle BDC = 50^\circ$, then $\angle OAB$ is equal to | 1 |
| | a. 40° b. 50° c. 90° d. 10° | |
| 2 | The simplest rationalizing factor of $\sqrt{5} - \sqrt{3}$ is | 1 |
| | a. $\sqrt{5} - \sqrt{3}$ c. $\sqrt{5} + \sqrt{3}$
b. $\sqrt{3} - \sqrt{5}$ d. None of these | |
| 3 | Signs of the abscissa and ordinate of a point in the II quadrant are respectively | 1 |
| | a. +, + c. +, -
b. -, - d. -, + | |
| 4 | Difference between 'postulate' and 'axiom' is | 1 |
| | a. there is no difference
b. few statements are termed as axioms and other as postulates
c. 'postulates' are assumptions used especially for geometry and 'axioms' are the assumptions used throughout mathematics
d. none of these | |
| 5 | If two complementary angles are in the ratio 13 : 5, then the angles are: | 1 |
| | a. $13^\circ, 5^\circ$ b. $25^\circ, 65^\circ$ c. $65^\circ, 25^\circ$ d. $65^\circ, 35^\circ$ | |
| 6 | If (4, 19) is a solution of the equation $y = ax + 3$, then $a =$ | 1 |
| | a. 3 b. 4 c. 5 d. 6 | |
| 7 | Diagonals of a cyclic quadrilateral are diameters of a circle, then the quadrilateral is | 1 |
| | a. A parallelogram b. a square c. a rectangle d. a trapezium | |
| 8 | To find the value of $28^3 + (-15)^3 - 13^3$, we use the formula: | 1 |
| | a. $x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$
b. $x^3 + y^3 - z^3 - 3xyz = (x + y - z)(x^2 + y^2 - z^2 - xy + yz + zx)$
c. $x^3 + y^3 + z^3 = 3xyz$ with $x = 28, y = -15$ and $z = 13$
d. $x^3 + y^3 + z^3 = 3xyz$ with $x = 28, y = -15$ and $z = -13$ | |
| 9 | Which of the following equations have (-1, 20) as one of its solutions | 1 |
| | a. $y = 30x + 50$ c. $y = 30x + 20$
b. $y + 30x = 50$ d. $y + 30x = 20$ | |
| 10 | Which of these is not a polynomial | 1 |
| | a. $\frac{x^2}{2} - 3xy + y^2$ c. $\sqrt{2x} - 1$
b. $x^2 + \frac{3x^2}{\sqrt{x}}$ d. $y^3 + 3y^2 - 2y + 16$ | |
| 11 | Which of the following is irrational | 1 |
| | a. $\sqrt{\frac{1}{9}}$ b. $0.\overline{13}$ c. $\frac{22}{7}$ d. $\sqrt{7}$ | |

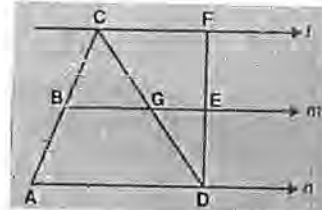
12 If the area of an equilateral triangle is $16\sqrt{3} \text{ cm}^2$, then the perimeter of the triangle is 1

- a. 48 cm b. 36 cm c. 24 cm d. 12 cm

13 The ratio of curved surface area of a cylinder and surface area of sphere of same radius of base and same height is 1

- a. 1 : 1 b. 1 : 2 c. 1 : 3 d. 1 : 4

14 In the given figure, $l \parallel m \parallel n$. If $AB=BC$, then which of the following is true 1



- a) $CG = GD$
b) $DE = EF$
c) $GE = \frac{1}{2}CF$
d) All of the above

15 In the class intervals 10-20, 20-30, the number 20 is included in: 1

- a. 10 - 20 c. both the intervals
b. 20 - 30 d. none of the intervals

16 It is given that $\triangle ABC \cong \triangle FDE$ and $AB=5\text{cm}$, $\angle B = 40^\circ$ and $\angle A = 80^\circ$, then which of the following is true, 1

- a. $DF = 5 \text{ cm}$, $\angle F = 60^\circ$ c. $DE = 5 \text{ cm}$, $\angle E = 60^\circ$
b. $DF = 5 \text{ cm}$, $\angle E = 60^\circ$ d. $DE = 5 \text{ cm}$, $\angle D = 40^\circ$

17 In $\triangle ABC$, $\angle A = \angle C$, $BC = 4\text{cm}$ and $AC = 3 \text{ cm}$, then the length of AB is 1

- a. 4 cm b. 3 cm c. 7 cm d. None of these

18 A chord of a circle is equal to the radius of the circle, then the angle subtended by the chord on the major arc is 1

- a. 90° b. 30° c. 120° d. 60°

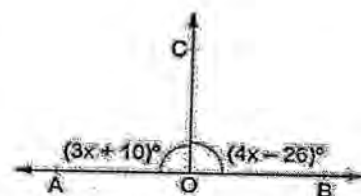
19 Assertion: Two opposite angles of a parallelogram are $(3x - 2)^\circ$ and $(50 - x)^\circ$. The measure of one of the angles is 37° 1

Reason: Opposite angles of a parallelogram are equal.

- a. Assertion is true, Reason is true; Reason is the correct explanation for Assertion.
b. Assertion is true, Reason is true; Reason is not the correct explanation for Assertion.
c. Assertion is true, Reason is false.
d. Assertion is false, Reason is true.

20 Assertion: In the given figure, AOB is a straight line. If $\angle AOC = (3x + 10)^\circ$ and $\angle BOC (4x - 26)^\circ$, then $\angle BOC = 86^\circ$ 1

Reason: The sum of angles that are formed on a straight line is equal to 180°



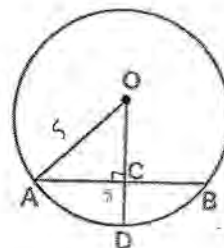
- a. Assertion is true, Reason is true; Reason is the correct explanation for Assertion.
b. Assertion is true, Reason is true; Reason is not the correct explanation for Assertion.
c. Assertion is true, Reason is false.
d. Assertion is false, Reason is true.

Section B

21 If the radius of a hemisphere is doubled, find the ratio of volume of new hemisphere to original hemisphere. 2

22 Express $18.\overline{48}$ in the form of rational number in $\frac{p}{q}$ form. 2

23 If $OA = 5 \text{ cm}$, $AB = 8 \text{ cm}$ and OD is perpendicular to AB , then find the length of OC and CD . 2



24 Factorize $x^2 - y^2 + 2x + 1$. 2

25 Determine the solution of the equation $2x + 5y = 20$ whose x-coordinate is $\frac{5}{2}$ times its ordinate 2

SECTION C

26 Show that: 3

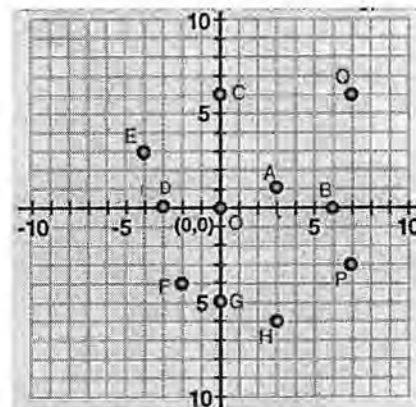
- $x + 3$ is a factor of $69 + 11x - x^2 + x^3$
- $2x - 3$ is a factor of $x + 2x^3 - 9x^2 + 12$.

27 Prove that 'Angles opposite to equal sides of an isosceles triangle are equal.' 3

28 Simplify $8^{\frac{2}{3}} - \sqrt{9} \times 10^0 + \left(\frac{1}{144}\right)^{-\frac{1}{2}}$ 3

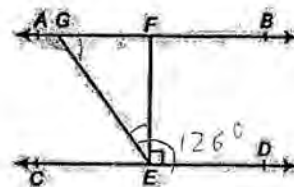
29 Identify the coordinates of: 3

- Point P
- Point(s) lying in the II quadrant.
- Mirror image of point H along X axis.
- Point(s) lying on Y axis



30 If $p = \frac{(\sqrt{3}-\sqrt{2})}{(\sqrt{3}+\sqrt{2})}$ and $q = \frac{(\sqrt{3}+\sqrt{2})}{(\sqrt{3}-\sqrt{2})}$, then find $p^2 + q^2$. 3

31 In the figure, if $AB \parallel CD$, $EF \perp CD$ and $\angle GED = 126^\circ$, find $\angle AGE$, $\angle GEF$ and $\angle FGE$. 3



SECTION D

32 Following is the frequency distribution of total marks obtained by the students of different sections of Class VIII out of 80. Represent the given data using a histogram and answer the following questions 5

Marks	0-20	20-40	40-60	60-80
Number of students	60	58	100	32

- What percentage of total strength scored between 40-60?
- If the pass percentage for this exam was 50%, how many students passed their exam?

33 Expand each of the following using suitable identity: 5

- $\left[\frac{3}{2}x - 4y\right]^3$
- $[-x - y + 5x]^2$

34 a. The perimeter of an isosceles triangle is 32 cm. The ratio of equal sides to its base is 3:2. Find the area of the triangle. 5

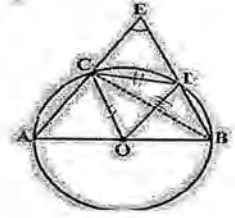
- Find the area of a triangle whose sides are 8cm and 11 cm and the perimeter is 32 cm.

35

Three girls Reshma, Salma and Mandip are playing a game by standing on a circle of radius 5m drawn in a park. Reshma throws a ball to Salma, Salma to Mandip, Mandip to Reshma. If the distance between Reshma and Salma and between Salma and Mandip is 6m each, what is the distance between Reshma and Mandip?

OR

- AB is a diameter of the circle, CD is a chord equal to the radius of the circle. AC and BD when extended intersect at a point E. Prove that $\angle AEB = 60^\circ$.
- Recall that two circles are congruent if they have the same radii. Prove that equal chords of congruent circles subtend equal angles at their centres.



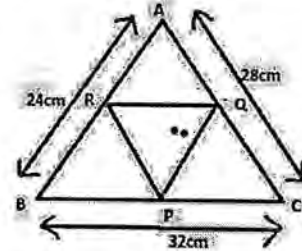
SECTION E

(Case Study Based)

36

Practical knowledge is very useful for student to grow in his carrier. To improve the practical knowledge and awareness about social life directorate of education announces a visit in a Kendriya Vidyalaya. Girls are asked to prepare a rangoli in triangular shape as shown in figure.

Dimension of rangoli ($\triangle ABC$) are 24cm, 32cm and 28cm. Garland is to be placed along the side of $\triangle PQR$, which is formed by joining the mid-points of sides of $\triangle ABC$. Some questions are arises about the above situation, answer the following questions



- What is the length of RQ? Justify.
- What is the length of PQ? Justify.
- Find the length of garland required.

1.5

1.5

1

37

Once four friends Rahul, Arun, Ajay and Vijay went for a picnic at a hill station. Due to peak season, they did not get a proper hotel in the city. The weather was fine so they decided to make a conical tent at a park. They were carrying 300 m^2 cloth with them. As shown in the figure they made the tent with height 10 m and diameter 14 m. The remaining cloth was used for the floor.



- How much cloth was used to make the tent (if $\sqrt{149} = 12.2$)?
- How much cloth was used for the floor?
- What was the volume of the tent?

2

1

1

38

To celebrate 'Diversity in India' school organized a competition for class IX students on the preparation of different food items of different parts of country. Jetha Lal and Champak Lal also participated and chose to prepare South Indian 'Idli'. Jetha Lal told Champak Lal that he has taken urad dal and rice as raw material for preparation of Idli in the ratio 2:5 On the basis of above information answer the following questions

- Form the linear equation of the above situation if y is the total batter and x represents the common ratio of the number of cups of urad dal and rice.
- If total quantity used for making Idli is 56 cups, then find the number of cups of rice and number of cups of urad dal used.
- Champak Lal asks if 4 cups of urad dal and 7 cups of rice be the right quantities to make Idli batter? Identify if he is right or not. Give reasons.

1

2

1