GREENLAWNS SCHOOL, WORLI
MATHEMATICS
PRELIM EXAM – 2024 - 25

STD: X **Marks: 80**
Date:09/01/2024 **Time: 3hrs**

Attempt **all** questions from **Section A** and **any four** questions from **Section B All *working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.***

Omission of essential working will result in loss of marks. The intended marks for questions or parts of questions are given in brackets [ ]

SECTION A

(*Attempt **all** questions from this Section)*

Question 1. Choose the correct answers to the questions from the options given. [15]

(Do not copy the questions, write the correct answer only)

i. Mr. Das invests in ₹ 100, 12% shares of Company A available at ₹ 60 each. Mr. Singh invests in ₹ 50, 16% shares of Company B available at ₹ 40 each. Use this information to state which of the following statements is true.

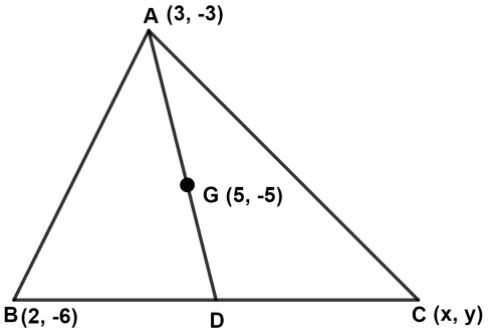
a. The rate of return for Mr. Das is 12%
b. The rate of return for Mr. Singh is 10%
c. Both Mr. Das and Mr. Singh have the same rate of return of 10%
d. Both Mr. Das and Mr. Singh have the same rate of return of 20%

ii. Which of the following is not a geometric progression?

a. 1/3, 1, 3, 9
b. 1/5, 1/5, 1/5, 1/5
c. -2, 4, -8, 16
d. 2, 0, 4, 0, 8, 0

iii. In the adjoining diagram, G is the centroid of △ ABC. A(3, -3), B(2, -6), C(x, y) and G(5, -5). The coordinates of point D are:

a. (2, -6)
b. (3, -6)
c. (6, -6)
d. (10, -6)



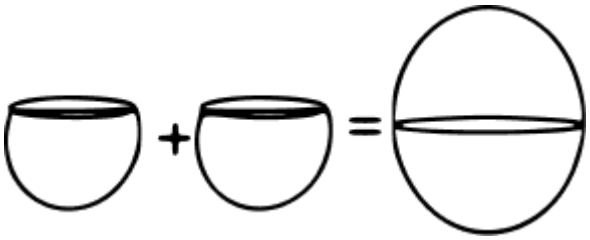
iv. A cylindrical metallic wire is stretched to double its length. Which of the following will **NOT** change for the wire after stretching?

a. Its curved surface area
b. Its total surface area
c. Its volume
d. Its radius

v. $\text{cosec}^2\,\theta + \sec^2\,\theta$ is equal to :

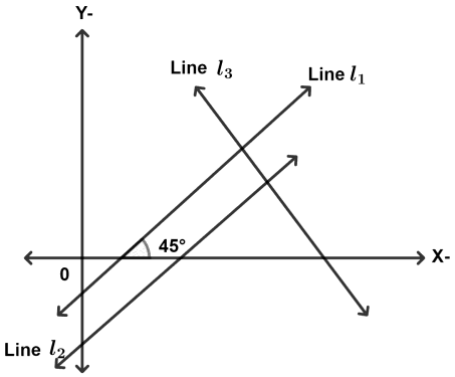
a. $\tan^2\,\theta + \cot^2\,\theta$
b. $\cot\,\theta + \tan\,\theta$
c. $(\cot\,\theta + \tan\,\theta)^2$
d. 1

vi. Two identical solid hemispheres are kept in contact to form a sphere. The ratio of the total surface areas of two hemispheres to the surface area of the sphere formed is:



a. 1 : 1 **b.** 3 : 2
c. 2 : 3 **d.** 2 : 1

vii. In the given figure line l_1 is a parallel to line l_2. If line l_3 is perpendicular to line l_1, then the slopes of lines l_2 and l_3 respectively are :

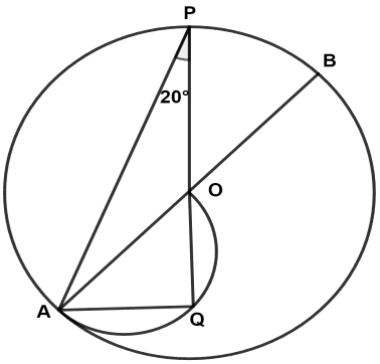


a. 1, 1
b. -1, -1
c. 1, -1
d. -1, 1

viii. The scale factor of a picture and the actual height of Sonia is 20 cm : 1.6 m. If her height in the picture is 18 cm, then her actual height is:

a. 14.4 m **b.** 2.25 m
b. 1.78 m **d.** 1.44 m

ix. In the adjoining figure, O is the center of the circle, and a semicircle is drawn on OA as the diameter. ∠APQ = 20°. The degree measure of ∠OAQ is :



a. 25°
b. 40°
c. 50°
d. 65°

x. Assertion (A) : For a collection of 11 arrayed data, the median is the middle number.
Reason (R) : For the data 5, 9, 7, 13, 10, 11, 10, the median is 13.

a. Both A and R are correct, and R is the correct explanation for A.
b. Both A and R are correct, and R is not the correct explanation for A.
c. A is true, but R is false.
d. Both A and R are true.

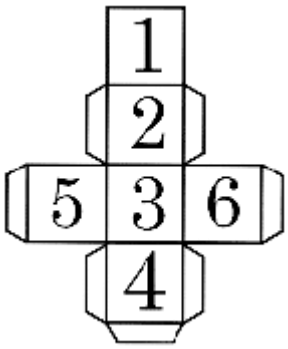
xi. Locus of a moving point is ..... if it moves such that it keeps a fixed distance from a fixed point.

a. Circle **b.** Line
c. Angle **d.** Line segment

xii. The point of concurrence of the angle bisectors of a triangle is called the ..... of the triangle.

a. Centroid **b.** incenter
c. Circumcenter **c.** orthocenter

xiii. When a die is cast with numbering on its faces, as shown, the ratio of the probability of getting a composite number to the probability of getting a prime number is ..... .

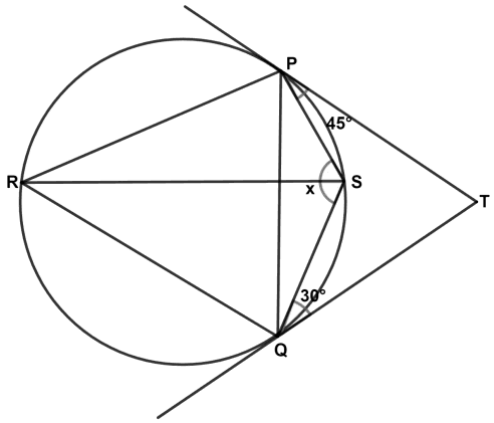


a. 2 : 3
b. 3 : 2
c. 1 : 3
d. 1 : 2

xiv. A man standing on a ship approaching the port towards the lighthouse is observing the top of the lighthouse. In 10 minutes, the angle of elevation of the top of the lighthouse changes from α to β. Then :

a. α > β
b. α < β
c. α = β
d. α ≤ β

xv. In the given figure, PT and QT are tangents to a circle such that ∠TPS = 45° and ∠TQS = 30°. Then, the value of x is:



a. 30°
b. 45°
c. 75°
d. 105°

Question 2

a. The sequence 2, 9, 16, ... is given. Identify the given sequence is an AP or a GP. Give reasons to support your answer.

i. Find the 20th term of the sequence.
ii. Find the difference between the sum of its first 22 and 25 terms

.

b. . The following bill shows the GST rate and the marked price of items:

S.No.	Item	Marked price (₹)	Quantity	Rate of GST
1	Wheat Flour (unpacked)	35.00	5 kg	x%
2	Basmati Rice (Branded & packed)	180.00	5 kg	5%
3	Surf Excel Quick Wash Detergent	220.00	y kg	18%

Find:

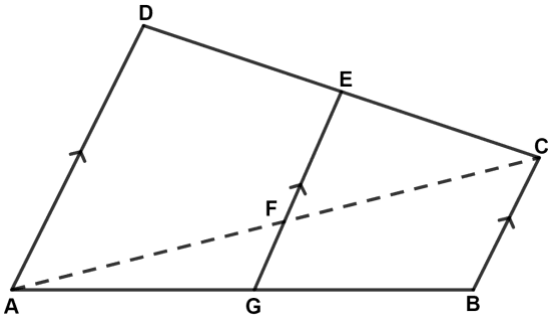
i. the value of x if the total GST on wheat flour and basmati rice is ₹ 45.
ii. the value of y, if CGST paid for detergent powder is ₹ 39.60
iii. total amount to be paid (including GST) for the above bill. **[4]**

c. A mathematics teacher uses certain amount of terracotta clay to form different shaped solids. First, she turned it into a sphere of radius 7 cm and then she made a right circular cone with base radius 14 cm. Find the height of the cone so formed. Also, compare the total surface areas of sphere and cone so formed. **[4]**

Question 3

a. In the figure given below (not drawn to scale),
AD ‖ GE ‖ BC, DE = 18 cm, EC = 3 cm,
AD = 35 cm. Find :

(i) AF : FC
(ii) length of EF
(iii) area(trapezium ADEF) : area(Δ EFC)
(iv) BC : GF



[4]

b. Construct a regular hexagon ABCDEF of side 4.3 cm and construct its circumscribed circle. Also, construct tangents to the circumscribed circle at points B and C which meets each other at point P.
Measure and record ∠BPC. **[4]**

c. Plot points A(0, 3), B(4, 0), C(6, 2) and D(5, 0). Reflect the points as given below and write their coordinates:

(a) Reflect A on x-axis to A'.
(b) Reflect B on y-axis to B'.
(c) Reflect C on x-axis to C'.
(d) D remain invariant when reflected on the line whose equation is .....
(e) Join the points A, B, C, D, C', B, A', B' and A to form a closed figure.

Name the closed figure BCDC'. **[5]**

Section B
(Attempt any four questions)

Question 4

a. Solve the following inequation and represent the solution set on the number line:

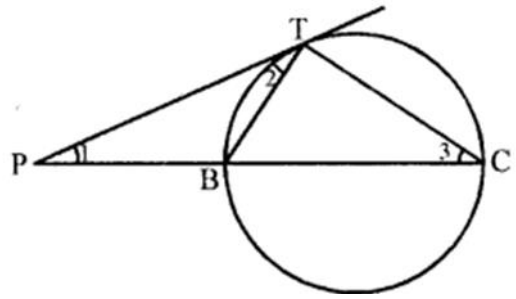
$$4x - 19 < \frac{3x}{5} - 2 \leq \frac{-2}{5} + x, x \in R$$ **[3]**

b. Prove: (cosec A – sin A) (sec A – cos A) (tan A + cot A) = 1. **[3]**

c. Mr. Britto deposits a certain sum of money each month in a Recurring Deposit Account of a bank. If the rate of interest is 8% per annum and Mr. Britto gets ₹ 8088 from the bank after 3 years, find the value of his monthly instalment. **[4]**

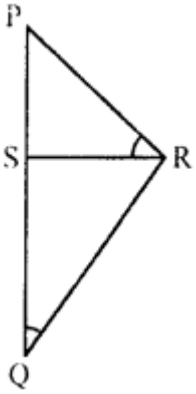
Question 5

a. In figure, PB = BT and PT is tangent to the circle, then prove that
(i) △PTC is isosceles
(ii) PB.PC = TC^2



b. Solve : $x^2 + 3x - 3 = 0$, giving your answer to two significant figures.

c. In the figure, the angles PRS and PQR are equal, PS = 2 cm and PR = 3 cm. If the area of the triangle PRS is 2 cm², calculate the area of △PQR. **[4]**



Question 6

a. Given $\frac{a^3+3ab^2}{b^3+3a^2b} = \frac{63}{62}$ that using componendo and dividendo find a : b. **[3]**

b. A man invests a sum of money in ₹ 100 shares, paying 15% dividend, quoted at 20% premium. If his annual dividend is ₹ 540, calculate:
(i) his total investment.
(ii) the rate of return on his investment. **[3]**

c. The length of a verandah is 3 m more than its breadth. The numerical value of its area is equal to the numerical value of its perimeter.
(i) Taking as the breadth of the verandah, write an equation in 'x' that represents the above statement.
(ii) Solve the equation in (i) above and hence find the dimension of the verandah. **[4]**

Question 7

a. If the polynomials $ax^3 + 4x^2 + 3x - 4$ and $x^3 - 4x - a$ leave the same remainder when divided by x – 2, find the value of a. **[3]**

b. A hollow sphere of internal and external diameters 6 cm and 10 cm respectively is melted and recast into a cone of base diameter 14 cm. Find the height of the cone. **[3]**

c. Draw histograms for the following distributions and find mode **[4]**

Class	1-10	11-20	21-30	31-40	41-50	51-60
Frequency	7	3	5	2	6	4

Question 8

a. Draw an ogive curve from the following data and

Weekly wages (Rs.)	0-20	20-40	40-60	60-80	80-100
No. of workers	40	51	60	38	7

Find:
(i) median wage
(ii) Inter quartile range
(iii) and number of workers earning less than Rs. 55 per week:

b. If a spinner illustrated is spun, what is the probability of getting
(i) an even number?
(ii) 3 or 5?
(iii) number greater than 4?
(iv) multiple of 2?

[4]

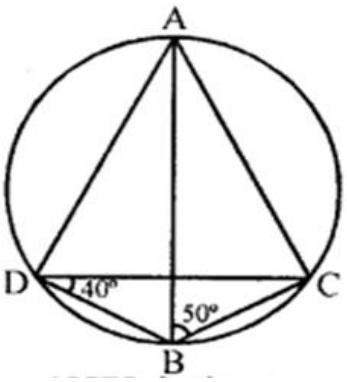
Question 9

a. The following table gives the marks scored by students in the examination:

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
No. of students	3	7	15	24	16	8	5	2

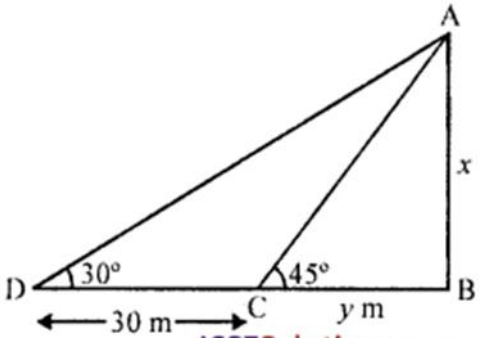
Calculate the mean mark, correct to two decimal places.

b. In figure, if ∠ABC = 50° and ∠BDC = 40°, calculate
(i) ∠CDA
(ii) ∠BAC
(iii) ∠BCA



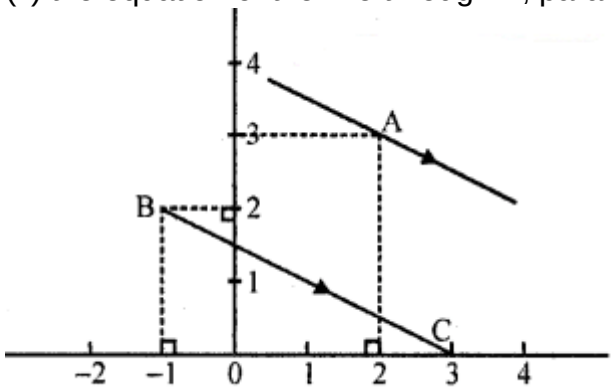
[3]

c. In the figure, it is given that AB is perp. to BD and is of length x metres. DC = 30m, ∠ADB = 30° and ∠ACB = 45° Without using tables, find x. **[4]**



Question 10

a. In the adjoining figure, write down
(i) the coordinates of the points A, B and C;
(ii) the equation of the line through A, parallel to BC.



b. Given a line segment AB joining the points A (-4, 6) and B (8, -3). Find
(i) the ratio in which AB is divided by the y-axis.
(ii) find the coordinates of the point of intersection.

c. The sum of some terms of a G.P. is 315 whose first term and the common ratio are 5 and 2 respectively. Find the last term and the number of terms.

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