

GREENLAWNS HIGH SCHOOL

Std 10

MATHEMATICS

80M

Time 2.5 hours

Preliminary Examination - 2023

Attempt all questions from Section A and any 4 questions from Section B.
Omission of essential steps will lead to loss of marks. Rough work must be done on the same page as the rest of the answer.

SECTION A

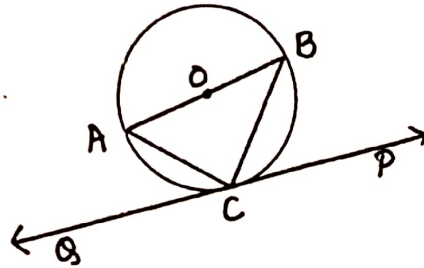
(Attempt all questions from this section)

Question 1

Choose the correct answers to the questions from the given options. (15)

- i) A dealer in Solapur sells goods worth Rs 12000 to a dealer in Mumbai, if the rate of GST is 18% then CGST is
a) Rs 1080 b) Rs 108 c) Rs 2160 d) Rs 216
- ii) Anil has a recurring deposit account in a bank for 2 years at 6% p.a. If he gets Rs 1200 as interest at the time of maturity, then his monthly instalment is
a) Rs 900 b) Rs 850 c) Rs 800 d) Rs 1000
- iii) If $A = \begin{pmatrix} 2 & -1 \\ 0 & 1 \end{pmatrix}$ then A^2 is
a) $\begin{pmatrix} 4 & -3 \\ 0 & 1 \end{pmatrix}$ b) $\begin{pmatrix} 4 & -2 \\ 0 & 1 \end{pmatrix}$ c) $\begin{pmatrix} 3 & -2 \\ 0 & 1 \end{pmatrix}$ d) $\begin{pmatrix} 4 & 3 \\ 0 & 1 \end{pmatrix}$
- iv) The solution set of the linear inequation $-5 < 2x + 1 \leq 6$, $x \in W$ is
a) $\{-3, -2, -1, 0, 1, 2\}$ b) $\{0, 1, 2\}$ c) $\{1, 2\}$ d) $\{0, 1\}$
- v) For the quadratic equation $x^2 - 6x + 9 = 0$ the roots are
a) Real and equal b) real & unequal c) not real d) none of these
- vi) If x, 9, 5 and 3 are in proportion then the value of x is
a) 16 b) 10 c) 15 d) 6
- vii) The 7th term of the AP 5, 15, 25, ... is
a) 60 b) 65 c) 75 d) 85
- viii) If $\Delta ABC \sim \Delta AQP$ and $AB = 8\text{cm}$, $BC = 11\text{cm}$, $PQ = 5.5\text{cm}$ then AQ is
a) 4.5cm b) 5cm c) 4cm d) 4.1cm
- ix) If the polynomial $x^3 - 3x^2 + 2x + 1$ is divided by $(x+1)$ then the remainder is
a) 5 b) -5 c) 4 d) 0

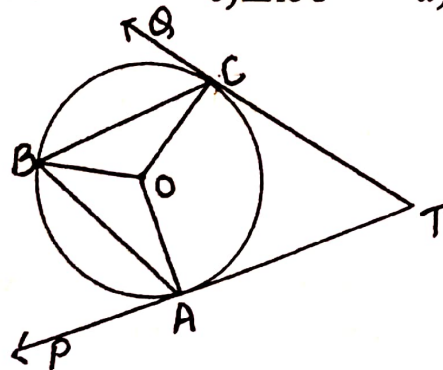
- x) When a die is rolled the probability of getting a multiple of 2 is
 a) $1/3$ b) $1/6$ c) $1/4$ d) $1/2$
- xi) If the angle of elevation of the top of a tower at a distance of 50m from its base is 45° then the height of the tower is
 a) 50m b) 500m c) 15.5m d) 10m
- xii) If the surface area of a sphere is 616 cm^2 then the radius of the sphere is
 a) 49cm b) 6cm c) 7cm d) 8cm
- xiii) In the figure drawn below O is the centre of the circle. Tangent PQ touches the circle at C, if $\angle BAC = 60^\circ$ then $\angle ACQ$ is



- a) 60° b) 30° c) 90° d) 40°
- xiv) The slope of a line whose inclination is 30° is
 a) 1 b) $\sqrt{3}$ c) 0 d) $1/\sqrt{3}$
- xv) The coordinates of point $(-5, 2)$ when reflected in the line $x=0$ is
 a) $(-5, -2)$ b) $(5, 2)$ c) $(5, -2)$ d) $(-5, 2)$

Question 2

- i) Mrs Mehta opened a recurring deposit account in a particular bank. She deposited Rs 300 per month for 3 years. The bank paid her Rs 12132 on maturity, find the rate of interest. (4)
- ii) The 11th term of an AP is 5, the 21st term is 3 and the last term is $-4/5$. Find the first term and the number of terms. (4)
- iii) In the figure drawn below TA and TC are tangents to the circle with centre O if $\angle BCQ = 50^\circ$ and $\angle BAP = 60^\circ$ find (4)
 a) $\angle OAB$ b) $\angle BOC$ c) $\angle AOC$ d) $\angle ATC$



Question 3

- i) A bag contains 7 white, 6 red and 8 green balls. If one ball is drawn at random from the bag. Find the probability that the ball drawn is (4)
- a) White
 - b) Not red
 - c) Either white or red
 - d) Red and green
- ii) Solve for 'x' using the properties of proportion (4)
- $$\frac{\sqrt{x+4} + \sqrt{x-12}}{\sqrt{x+4} - \sqrt{x-12}} = 5$$
- iii) Use a graph paper for this question (5)
- a) Plot points A(0,5) , B(-4,3) and C(-4,0)
 - b) Reflect A in X axis to get A' & write its coordinates
 - c) Reflect B & C in Y axis to get B' & C' respectively. Write its coordinates
 - d) Write the geometrical name of the figure ABCA'C'B'
 - e) Name any one point invariant in the Yaxis which is also on this figure

SECTION B

(Attempt any 4 questions from this section)

Question 4

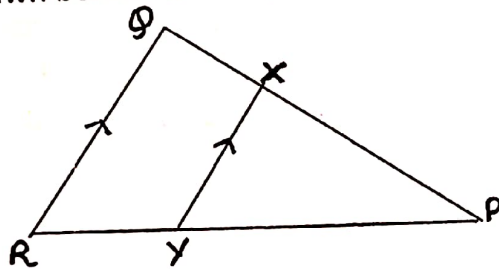
- i) Solve the following linear inequation and graph the solution on a real number line (3)
- $$\frac{-1}{6} \leq \frac{x}{3} - 1 \frac{1}{6} < \frac{11}{6}, x \in R$$
- ii) A solid sphere whose radius is 12cm is melted and recast into cones whose diameter is 4cm and height is 3cm. Calculate the number of cones formed. (3)
- iii) A shopkeeper buys an LCD TV at a discount of 20% on the marked price of Rs 8000, he sells it to a customer at the marked price. If the GST at each stage is 18% and the sales are intra state find (4)
- a) GST paid by the shopkeeper to the Central Government
 - b) Price paid by the customer inclusive of tax

Question 5

- i) Solve the following quadratic equation and express your answer correct to 3 significant figures $5x^2 - 3x - 9 = 0$ (3)
- ii) If $A = \begin{pmatrix} -3 & 2 \\ 1 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} -7 & 0 \end{pmatrix}$, find matrix X such that $XA=B$ (3)
- iii) Using factor theorem factorise $x^3 + 10x^2 - 37x + 26$ completely (4)

Question 6

- i) Calculate the ratio in which the line segment joining A(6,3) & B(4,-2) is divided by the line $y=2$. Hence find the point of intersection. (3)
- ii) In the figure drawn below $XY \parallel QR$, $RY:YP = 5:4$ if $QX = 7.5\text{cm}$ find PQ (3)

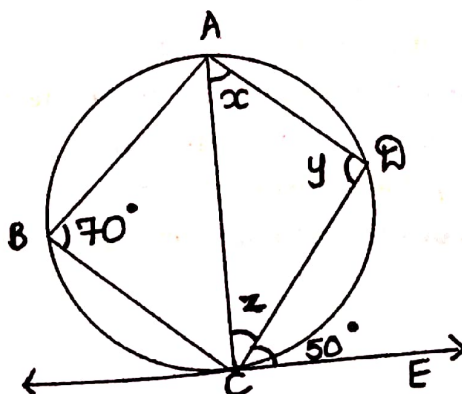


- iii) Draw a regular hexagon whose each side is 5.1cm, circumscribe a circle to this hexagon and record the radius. Use a compass and ruler only. (4)

Question 7

- i) Prove that $\frac{1+\cos A}{1-\cos A} = \frac{\tan^2 A}{(\sec A - 1)^2}$ (3)

- ii) In the figure drawn below CE is a tangent to the circle $\angle ABC = 70^\circ$, $\angle DCE = 50^\circ$. Find x, y and z (3)



- iii) Draw a histogram for the following data and estimate the mode also (4)
Mention the modal class

CI	5-10	10-15	15-20	20-25	25-30	30-35
f	8	11	15	24	16	10

Question 8

- i) Find the value of 'a' if the lines $7y-ax=4$ & $2y+x=3$ are perpendicular to each other. (3)
- ii) Find the sum of the terms of the AP 54, 52, 50, 10 (3)
- iii) Find the mean of the following distribution using step deviation method (4)

CI	40-50	500-60	60-70	70-80	80-90	90-100
f	12	10	6	12	5	5

Question 9

- i) The table drawn below shows the number of people from a particular society (6)
From different age groups who were vaccinated against Covid 19

Age	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of people	6	12	39	46	57	20	15	7

Draw an ogive for the above distribution and estimate the following

- a) Median
b) Upper Quartile
c) Number of people vaccinated who are above 65 years old
d) Number of people vaccinated who are less than 35 years old
- ii) From the top of a tower 200m high the angles of depression of the top and bottom of a pillar are 45° & 60° respectively. Find the height of the pillar and the distance between the tower and the pillar. (4)

Question 10

- i) If $P = \begin{pmatrix} 2 & 3 \\ -1 & 4 \end{pmatrix}$ & $Q = \begin{pmatrix} 1 & 4 \\ -2 & 0 \end{pmatrix}$ find $3P - 2Q$ (3)
- ii) A spherical glass vessel which has a cylindrical neck 10cm long and 14cm diameter. The radius of the spherical part is 21cm, calculate the volume of the vessel. (3)
- iii) Rohan bought a certain number of identical articles for Rs 360. When the price of each article was reduced by Rs3, he could buy 6 more articles for the same amount. Find the original price of each article. (4)