



INDIAN SCHOOL SOHAR
PRE-BOARD I EXAMINATION (2024-25)
STANDARD MATHEMATICS (041)

No. of printed pages: 5

CLASS:X

MAX.MARKS: 80

DATE: 02/01/25

TIME: 3 HOURS

General Instructions:

This Question Paper has 5 Sections A, B, C, D and E.

Section A has 20 MCQs carrying 1 mark each

Section B has 5 questions carrying 02 marks each.

Section C has 6 questions carrying 03 marks each.

Section D has 4 questions carrying 05 marks each.

Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.

All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.

Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

Section A
Section A consists of 20 questions of 1 mark each.

1.	If $\sin x + \operatorname{cosec} x = 2$, the value of $\sin^{19} x + \operatorname{cosec}^{20} x$ is (a) 2^{19} (b) 2 (c) 2^{20} (d) 2^{39}	1												
2.	The degree of the polynomial $\sqrt{3}$ is (a) 3 (b) 1 (c) 0 (d) not defined	1												
3.	The value of k for which the lines $5x + 7y = 3$ and $15x + 21y = k$ coincide is (a) 9 (b) 5 (c) 7 (d) 18	1												
4.	The perpendicular distance of a point P(-5, 3) from y –axis is: (a) 3 units (b) -5 units (c) 5 units (d) -3 units	1												
5.	The ratio in which the line segment joining the points P(-3, 10) and Q(6, – 8) is divided by O(-1, 6) is: (a) 1:3 (b) 3:4 (c) 2:7 (d) 2:5	1												
6.	A number is chosen from the numbers 1, 2, 3 and denoted as x and a number is chosen from the numbers 1, 4, 9 and denoted as y. Then the Probability of product of x and y less than 9 is: (a) $\frac{1}{9}$ (b) $\frac{3}{9}$ (c) $\frac{5}{9}$ (d) $\frac{7}{9}$	1												
7.	Find the upper limit of the median class for the given frequency distribution: <table border="1" style="margin: 10px auto; border-collapse: collapse; width: 80%;"> <thead> <tr> <th style="padding: 5px;">Class</th> <th style="padding: 5px;">0 - 5</th> <th style="padding: 5px;">5 - 10</th> <th style="padding: 5px;">10 - 15</th> <th style="padding: 5px;">15 - 20</th> <th style="padding: 5px;">20 - 25</th> </tr> </thead> <tbody> <tr> <th style="padding: 5px;">Frequency</th> <td style="padding: 5px;">8</td> <td style="padding: 5px;">10</td> <td style="padding: 5px;">19</td> <td style="padding: 5px;">25</td> <td style="padding: 5px;">8</td> </tr> </tbody> </table> (a) 5 (b) 10 (c) 15 (d) 20	Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	Frequency	8	10	19	25	8	1
Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25									
Frequency	8	10	19	25	8									
8.	A letter of English alphabets is chosen at random. What is the probability that it is a letter of the word 'MATHEMATICS'? (a) $\frac{4}{13}$ (b) $\frac{9}{26}$ (c) $\frac{5}{13}$ (d) $\frac{11}{26}$	1												
9.	If $x + 2$ is a factor of $x^2 + ax + 2b$ and $a + b = 4$, then (a) $a = 1, b = 3$ (b) $a = 3, b = 1$ (c) $a = -1, b = 5$ (d) $a = 5, b = -1$	1												

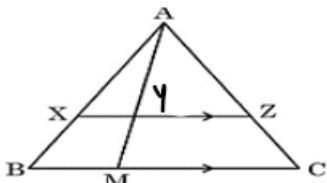
10	If the n th term of an A.P. is $(2n + 1)$, then the sum of its first three terms is (a) 6 (b) 15 (c) 12 (d) 21	1
11	If $k + 7$, $2k - 2$ and $2k + 6$ are three consecutive terms of an A.P., then the value of k is (a) 15 (b) 17 (c) 5 (d) 1	1
12	If seven books and 5 pens cost Rs 410, whereas five books and seven pens cost Rs.334 then the sum of cost of a book and a pen would be (a) 60 (b) 20 (c) 12 (d) 62	1
13	The area of the circle that can be inscribed in a square of 6cm is (a) $36\pi \text{ cm}^2$ (b) $18\pi \text{ cm}^2$ (c) $12\pi \text{ cm}^2$ (d) $9\pi \text{ cm}^2$	1
14	In ΔPQR and ΔMST , $\angle P = 55^\circ$, $\angle Q = 25^\circ$, $\angle M = 100^\circ$ and $\angle S = 25^\circ$, then (a) $\Delta TSM \sim \Delta PQR$ (b) $\Delta TSM \sim \Delta QPR$ (c) $\Delta MST \sim \Delta QRP$ (d) $\Delta TMS \sim \Delta RQP$	1
15	In ΔABC , if $DE \parallel BC$, $AD = 3\text{cm}$, $BD = 4\text{cm}$ and $BC = 14\text{ cm}$ then DE equals (a) 7 cm (b) 3 cm (c) 4 cm (d) 6 cm	1
16	The sum of the length, breadth and height of a cuboid is $6\sqrt{3}\text{cm}$ and the length of its diagonal is $2\sqrt{3}\text{cm}$. The total surface area of the cuboid is (a) 48 cm^2 (b) 72 cm^2 (c) 96 cm^2 (d) 108 cm^2	1
17	OACB is a quadrant of a circle with centre O and radius 7 cm where ACB is the arc. Then the perimeter of the quadrant is : (a) 15 cm (b) 50 cm (c) 25 cm (d) 44 cm	1
18	The value of $\sin^2 60^\circ + 2 \tan 45^\circ - \cos^2 30^\circ$ is (a) 1 (b) 2 (c) 4 (d) 0	1

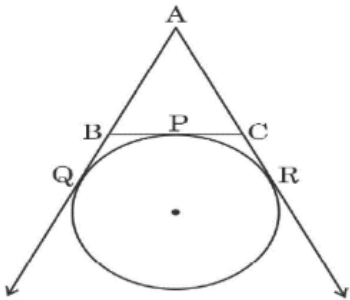
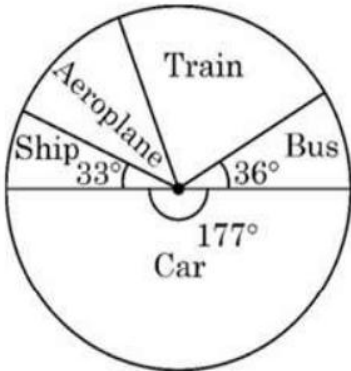
Questions number 19 and 20 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

- (a) Both Assertion(A) and Reason(R) are true and Reason (R) is the correct explanation of the Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
 (c) Assertion (A) is true, but Reason (R) is false.
 (d) Assertion (A) is false, but Reason (R) is true

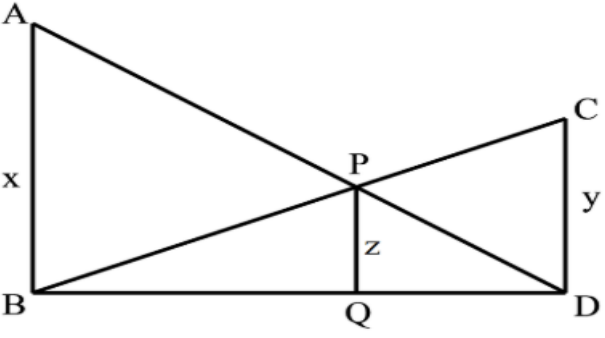
19	Assertion(A): If the circumference of a circle is 176 cm, then its radius is 28 cm. Reason(R): Circumference = $\pi \times$ radius of a circle	1
20	Assertion(A): D and E are points on the sides AB and AC respectively of a ΔABC such that $DE \parallel BC$ then the value of x is 4, when $AD = x \text{ cm}$, $DB = (x - 2) \text{ cm}$, $AE = (x + 2) \text{ cm}$ and $EC = (x - 1) \text{ cm}$. Reason (R): If a line is parallel to one side of a triangle then it divides the other two sides in the same ratio.	1

Section B
Section B consists of 5 questions of 2 marks each.

21	In the given figure, XZ is parallel to BC . $AZ = 3 \text{ cm}$, $ZC = 2 \text{ cm}$, $BM = 3 \text{ cm}$ and $MC = 5 \text{ cm}$. Find the length of XY . 	2
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22.	(a) Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact. OR (b) A circle is touching the side BC of a $\triangle ABC$ at the point P and touching AB and AC produced at points Q and R respectively. Prove that $AQ = \frac{1}{2} (\text{Perimeter of } \triangle ABC)$	2
		
23.	An hour hand of a clock is 5cm long. Find the area formed by this hand in 7 minutes.	2
24.	If the zeroes of the polynomial $x^2 + px + q$ are double in value to the zeroes of the polynomial $2x^2 - 5x - 3$, then find the values of p and q.	2
25.	(a) If $\sqrt{2}$ is given as an irrational number, then prove that $(5 + 2\sqrt{2})$ is an irrational number. OR (b) Check whether 6^n can end with the digit 0 for any natural number n.	2
Section C Section C consists of 6 questions of 3 marks each.		
26.	Compute the zeroes of the polynomial $(x - 3)^2 - 4$. Also, establish a relationship between the zeroes and coefficients.	3
27.	The students of a class are made to stand in rows. If 3 students are extra in a row, there would be 1 row less. If 3 students are less in a row, there would be 2 rows more. Find the number of students in the class	3
28.	In a survey on holidays, 120 people were asked to state which type of transport they used on their last holiday. The following pie chart shows the results of the survey.  Observe the pie chart and answer the following questions: (i) If one person is selected at random, find the probability that he/she travelled by bus or ship. (ii) Which is most favorite mode of transport and how many people used it? (iii) A person is selected at random. If the probability that he did not use train is $\frac{4}{5}$, find the number of people who used train.	3
29.	Find the ratio in which the line $x - 3y = 0$ divides the line segment joining the points $(-2, -5)$ and $(6, 3)$. Find the coordinates of the point of intersection.	3
30.	(a) A peacock is sitting on the top of a pillar which is 9m high. From a point, 27m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake, the peacock pounces it. If their speeds are equal, at what distance from the hole is the snake caught? OR (b) If the equation $(1 + m^2)x^2 + 2mcx + c^2 - a^2 = 0$ has equal roots, then show that $c^2 = a^2(1 + m^2)$.	3

31. In the given figure $AB \parallel PQ \parallel CD$, $AB = x$ units, $CD = y$ units and $PQ = z$ units. prove that $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$



OR

P and Q are points on the sides AB and AC respectively of a triangle ABC. If $AP = 2$ cm, $PB = 4$ cm, $AQ = 3$ cm, $QC = 6$ cm, prove that $BC = 3PQ$.

Section D

Section D consists of 4 questions of 5 marks each.

32. If $\operatorname{cosec} \theta - \sin \theta = m$ and $\sec \theta - \cos \theta = n$, prove that $(m^2 n)^{2/3} + (mn^2)^{2/3} = 1$.

5

33. (a) A right triangle whose sides are 15 cm and 20 cm (other than hypotenuse), is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed. (Use $\pi = 3.14$)

OR

(b) A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere of same radius. If the diameter of the hemisphere is 16 cm and the total height of the toy is 14 cm, find the volume and total surface area of the toy. (Use $\pi = 3.14$)

5

34. (a) The angle of elevation of a cloud from a point 60 m above a lake is 30° and the angle of depression of the reflection of cloud in the lake is 60° . Find the height of the cloud.

OR

(b) An aeroplane when flying at a height of 4,000 m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the aeroplanes at that instant (Use $\sqrt{3} = 1.73$)

5

35. Find the median and mode of the following data:

Classes	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	6	8	10	12	6	5	3

5

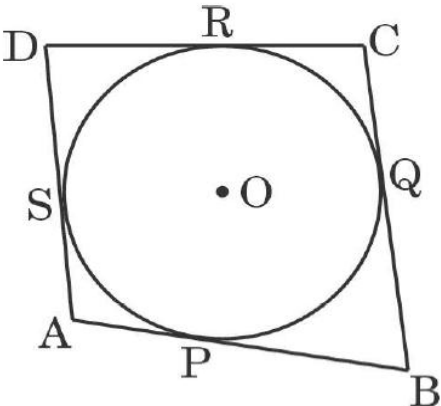
Section E

Section E has 3 case based integrated units of assessment with sub- parts of the values of 1, 1 and 2 marks each respectively.

36. Push-ups are a fast and effective exercise for building strength. These are helpful in almost all sports including athletics.



Nitesh wants to participate in the push-up challenge. He can currently make 3000 push-ups in one hour. But he wants to achieve a target of 3900 push-ups in 1 hour for which he practices regularly. With each day of practice, he is able to make 5 more push-ups in one hour as compared to the previous day. If on first day of practice he makes 3000 push-ups and continues to practice regularly till his target is achieved. Keeping the above situation in mind answer the

	following questions: i) Form an A.P representing the number of push-ups per day (ii) find the minimum number of days he needs to practice before the day his goal is accomplished? iii)(a) Find the total number of push-ups performed by Nitesh up to the day his goal is achieved. OR (iii)(b) Find the number of push-ups performed by Nitesh on tenth day.	1 1 2 2
37	In a park, four poles are standing at positions A, B, C and D around the circular fountain such that the cloth joining the poles AB, BC, CD and DA touches the circular fountain at P, Q, R and S respectively as shown in the figure.  Based on the above information, answer the following questions: (i) If O is the centre of the circular fountain, then find $\angle OSA$. (ii) If $AB = AD$, then write the name of the figure ABCD. (iii) (a) If $DR = 7$ cm and $AD = 11$ cm, then find the length of AP. OR (iii) (b) If O is the centre of the circular fountain with $\angle QCR = 60^\circ$, then find $\angle QOR$.	1 1 2 2
38.	During International Book Giving Day few people donated the following number of books of various subjects to a public library: History = 96, Science = 240, Mathematics = 336 These books have to be arranged in minimum number of stacks such that each stack contains books of only one subject and the number of books on each stack is the same. Based on the above information, answer the following questions: (i) How many books are arranged in each stack? (ii) How many stacks are used to arrange all the Mathematics books? (iii) (a) Determine the total number of stacks that will be used for arranging all the books. OR (iii) (b) If the thickness of each book of History and Science is 1.8 cm and 2.2 cm respectively then find the height of each stack of History and Science.	1 1 2 2

*****THE END*****

