INDIAN SCHOOL AL WADI AL KABIR **ISWKP2/041/1/1**

Second Rehearsal Examination (2024-25)

Sub: MATHEMATICS STANDARD (041)

Roll Number: | | | | | | | |

Date: 16-01-2025 **Set 1** Maximum marks: 80

Class: X Time: 3 hours

General Instructions:

Read the following instructions very carefully and strictly follow them:

(i) This question paper contains **38** questions. **All** questions are **compulsory.**

(ii) This question paper is divided into **five** Sections **A, B, C, D and E.**

(iii) In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.

(iv) In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.

(v) In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.

(vi) In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.

(vii) In **Section E**, Questions no. **36** to **38** are case study-based questions carrying **4** marks each. Internal choice is provided in **2** marks questions in each case-study.

(viii) There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 3 questions in Section E.

(ix) Draw neat diagrams wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated.

(x) Use of calculators is **not** allowed.

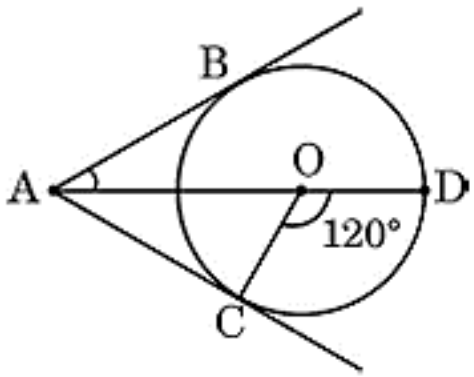
SECTION A

This section comprises multiple choice questions (MCQs) of 1 mark each.

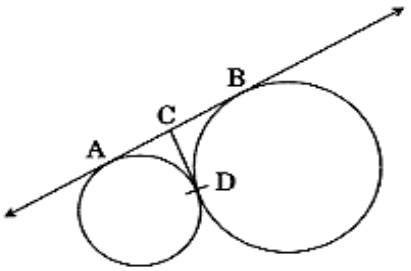
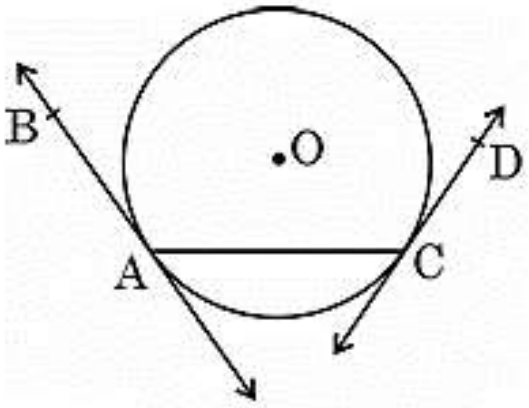
Q.1. If 5 times the 5th term of an A.P. is equal to 9 times the 9th term, then its 14th term is

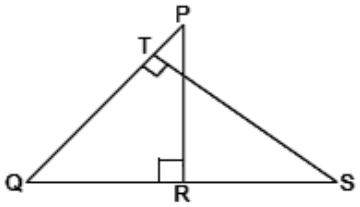
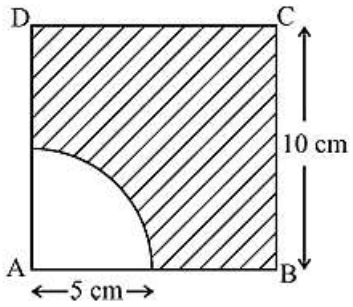
(A)	5	**(B)**	9	**(C)**	0	**(D)**	14

Q.2.	The value(s) of p, for which the lines represented by the following pair of linear equations is/are parallel is $3x - y - 5 = 0$ $6x - 2y - p = 0$							
	(A)	all real values except 10	**(B)**	10	**(C)**	$\frac{5}{2}$	**(D)**	$\frac{1}{2}$
Q.3.	A card is drawn from a well shuffled deck of 52 playing cards. The probability that drawn card is a red queen is							
	(A)	$\frac{1}{13}$	**(B)**	$\frac{2}{13}$	**(C)**	$\frac{1}{52}$	**(D)**	$\frac{1}{26}$
Q.4.	If HCF (336, 54) = 6, then LCM (336,54) is							
	(A)	3024	**(B)**	3600	**(C)**	3360	**(D)**	3200
Q.5.	The simplified form of $\frac{cos^2\ \theta}{sin^2\ \theta} - \frac{1}{sin^2\ \theta}$ is							
	(A)	$tan^2\ \theta$	**(B)**	$sec^2\ \theta$	**(C)**	1	**(D)**	-1
Q.6.	If $\Delta PQR \sim \Delta ABC$; PQ = 6cm, AB = 8cm and the perimeter of ΔABC is 36cm, then the perimeter of ΔPQR is							
	(A)	20.25 cm	**(B)**	27 cm	**(C)**	48 cm	**(D)**	64 cm
Q.7.	A car is moving away from the base of a 30 m high tower. The angle of elevation of the top of the tower from the car at an instant, when the car is $10\sqrt{3}$ m away from the base of the tower, is							
	(A)	30°	**(B)**	45°	**(C)**	90°	**(D)**	60°
Q.8.	If the length of an arc of a circle subtending an angle θ at the centre is numerically equal to the area of the sector formed by it, then the radius of the circle is							
	(A)	1 unit	**(B)**	2 units	**(C)**	3 units	**(D)**	$\frac{1}{2}$ unit

Q.9.	Which of the following numbers cannot be the probability of happening of an event?							
	(A)	0	**(B)**	$\frac{7}{0.01}$	**(C)**	0.07	**(D)**	$\frac{0.07}{3}$
Q.10.	The circumference of a circle is 100 cm. The side of a square inscribed in the circle is							
	(A)	$50\sqrt{2}$ cm	**(B)**	$\frac{100}{\pi}$ cm	**(C)**	$\frac{50\sqrt{2}}{\pi}$ cm	**(D)**	$\frac{100\sqrt{2}}{\pi}$ cm
Q.11.	In the given figure, AC and AB are tangents to a circle centered at O. If ∠COD = 120°, then ∠BAO is equal to 							
	(A)	30°	**(B)**	60°	**(C)**	45°	**(D)**	90°
Q.12.	The probability that in a family of three children, there will be at least two boys is							
	(A)	$\frac{1}{8}$	**(B)**	$\frac{7}{8}$	**(C)**	$\frac{4}{8}$	**(D)**	$\frac{6}{8}$
Q.13.	If a and b are the roots of the equation $x^2 + ax - b = 0$, then the values of a and b are							
	(A)	a = -1, b = 2	**(B)**	a = 1, b = 2	**(C)**	a = -2, b = 1	**(D)**	a = 2, b = -1
Q.14.	If three numbers in A.P. have the sum 30, then the middle term is							
	(A)	4	**(B)**	10	**(C)**	16	**(D)**	8
Q.15.	If the distance between the points (3, -5) and (x, -5) is 15 units, then the values of x are:							
	(A)	12, -18	**(B)**	-12, 18	**(C)**	18, 5	**(D)**	-9, -12

<table>
<tr><td>Q.16.</td><td colspan="8">The radii of 2 cylinders are in the ratio 2: 3 and their heights are in the ratio 5: 3. Then, the ratio of their volumes is:</td></tr>
<tr><td></td><td>(A)</td><td>19: 20</td><td>(B)</td><td>20: 27</td><td>(C)</td><td>18: 25</td><td>(D)</td><td>17: 23</td></tr>
<tr><td>Q.17.</td><td colspan="8">The coordinates of the mid-point of a line segment joining the points A (3, – 1) and B (7, 5) are (5a, 2b). The value of (a + b) is</td></tr>
<tr><td></td><td>(A)</td><td>7</td><td>(B)</td><td>3</td><td>(C)</td><td>2</td><td>(D)</td><td>5</td></tr>
<tr><td>Q.18.</td><td colspan="8">If 5 tan θ = 12, then $\frac{13 \sin \theta}{3}$ is</td></tr>
<tr><td></td><td>(A)</td><td>2</td><td>(B)</td><td>4</td><td>(C)</td><td>12</td><td>(D)</td><td>1</td></tr>
<tr><td></td><td colspan="8">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 Assertion (A)
(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
(c) Assertion (A) is true, but reason (R) is false.
(d) Assertion (A) is false, but reason (R) is true.</td></tr>
<tr><td>Q.19.</td><td colspan="8">Assertion (A): Zeroes of a polynomial p(x) = $x^2 - 2x - 3$ are -1 and 3.
Reason (R): The graph of polynomial p(x) = $x^2 - 2x - 3$ intersects x-axis at (-1, 0) and (3, 0)</td></tr>
</table>

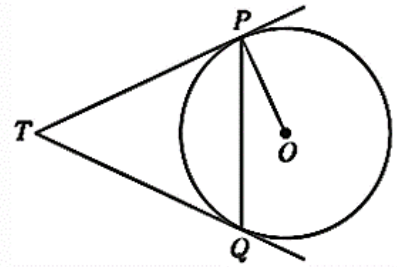
Q.20.	**Assertion (A):** In the below figure, AB and CD are common tangents to circles which touch each other at D. If AB = 8 cm, then the length of CD is 4 cm.  **Reason (R):** A tangent to a circle is perpendicular to the radius through the point of contact.
SECTION B	
This section comprises very short answer (VSA) type questions of 2 marks each	
Q.21.	(a) Evaluate: $\frac{2\tan 30° .\ \sec 60° . \tan 45°}{1- sin^2\ 60°}$ **OR** (b) If cos A + $cos^2\ A$ = 1, then find the value of $sin^2 A + sin^4 A$.
Q.22.	Show that 15^n cannot end with the digit 0, for any natural number 'n'.
Q.23.	In the given figure, AB and CD are tangents to a circle centered at O. Is ∠BAC=∠DCA? Justify your answer. 

Q.24	In the figure, PQR and QST are two right triangles, right angled at R and T respectively. Prove that QR × QS = QP × QT. 
Q.25.	(a)In the given figure, ABCD is a square of side 10 cm. A sector of radius 5 cm is cut out from one of the corners. Find the area of the shaded region. (Take π = 3.14)  **OR** (b) The length of the minute-hand of a clock is 14 cm. Find the area swept by the minute hand in 20 minutes.
SECTION C	
This section comprises of short answer (SA) type questions of 3 marks each.	
Q.26.	(a) If 217x + 131y = 913 and 131x + 217y = 827, then solve the equations for the values of x and y. **OR** (b)Three years ago, Rashmi was thrice as old as Nazma. Ten years later, Rashmi will be twice as old as Nazma. How old are Rashmi and Nazma now?
Q.27.	Prove that $\frac{5-\sqrt{2}}{3}$ is an irrational number, given that $\sqrt{2}$ is an irrational number
Q.28.	Prove that $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$

Q.29

(a) Two tangents TP and TQ are drawn to a circle with centre O from an external point T.

Prove that ∠ PTQ = 2 ∠ OPQ.



OR

(b)Prove that the opposite sides of a quadrilateral circumscribing a circle subtends supplementary angles at the centre of the circle.

Q.30.

If the mode of the following frequency distribution is 57.5, find the value of x.

Classes	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100
Frequency	6	10	16	x	10	5	2

Q.31.

Find the zeroes of the polynomial $2x^2 - 9x - 45$ and verify the relationship between the zeroes and the coefficients of the polynomial.

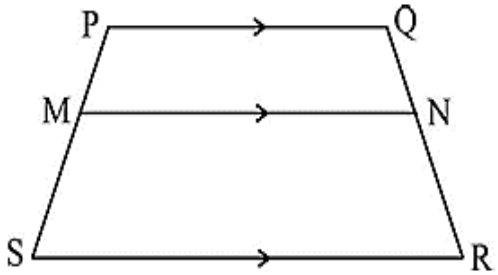
SECTION D

This section comprises long answer (LA) type questions of 5 marks each.

Q.32.

(i) Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.

(ii) PQRS is a trapezium with PQ ‖ SR. If M and N are two points on the non-parallel sides PS and QR respectively, such that MN is parallel to PQ, then show that $\frac{PM}{MS} = \frac{QN}{NR}$.



Q.33.

(a) The largest possible hemisphere is drilled out from a wooden cubical block of side 21 cm such that the base of the hemisphere is on one of the faces of the cube.

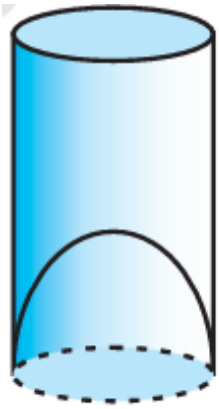
Find (i) the volume of wood left in the block

(ii) the total surface area of the remaining solid.

OR

(b)A juice seller was serving his customers using glasses as shown in the figure. The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity.

(Use $\pi = 3.14$.)



Q.34.

The following table gives production yield per hectare of wheat of 100 farms of a village:

Production yield (in kg/ha)	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80
No. of farms	2	8	12	24	38	16

Find the mean and the median of the given data:

Q.35.

(a) In an A.P., the first term is – 4, the last term is 29 and the sum of all its terms is 150.

Find its common difference.

OR

(b)The ratio of the 11th term to 17th term of an A.P. is 3:4. Find the ratio of 5th term to 21st term of the same A.P. Also, find the ratio of the sum of first 5 terms to that of first 21 terms.

SECTION E

This section comprises 3 case study- based questions of 4 marks each.

Q.36.

Case Study- 1

Totem poles are made from large tress. These poles are carved with symbols or figures. In the given picture, two such poles of equal heights are standing 28 m apart. From a point somewhere between them in the same line, the angles of elevation of the top of the two poles are 60^0 and 30^0 respectively.

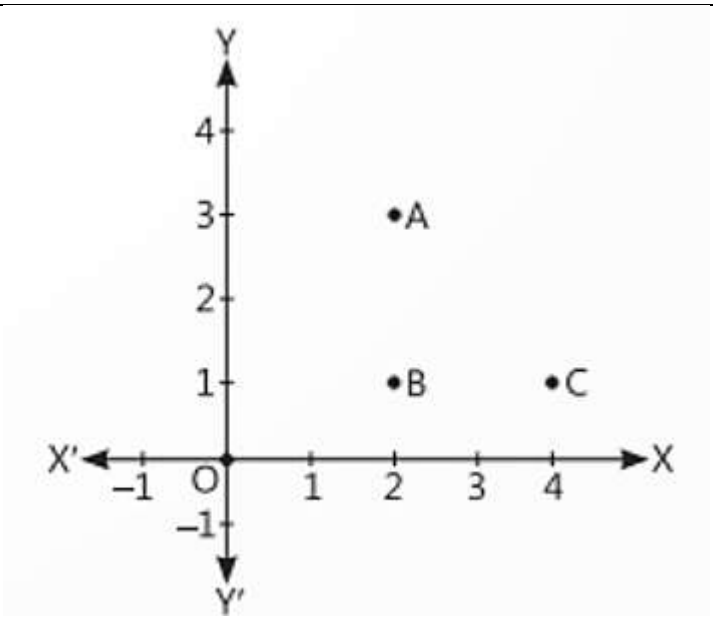
Based on the above information, answer the following questions:

(i)	Draw a neat labelled diagram.	1m
(ii)	(a) Find the height of the poles. **OR** (b)If the distance of the top of the poles from the point of observation are taken as p and q, then find a relation between p and q.	2m 2m
(iii)	Find the location of the point of observation from the foot of these poles.	1m

Q.37.

Case Study- 2

Alia and Shagun are friends living on the same street in Patel Nagar. Shagun's house is at the intersection of one street with another street on which there is a library. They both study in the same school and that is not far from Shagun's house. Suppose the school is situated at the point O, i.e., the origin, Alia's house is at A. Shagun's house is at B and library is at C.



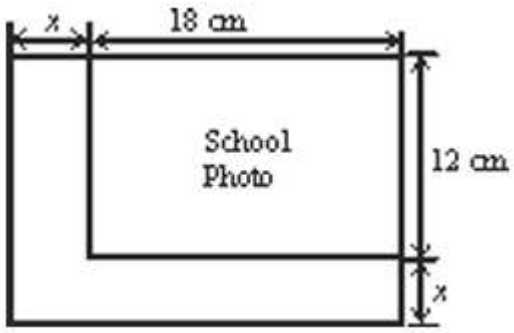
Based on the above information, answer the following questions:

(i)	How far is Alia's house from Shagun's house?	1m
(ii)	How far is the library from Shagun's house?	1m
(iii)	(a)Show that for Shagun, school is farther compared to Alia's house and the library. **OR** (b)Show that the locations of Alia's house, Shagun's house and the library form the vertices of an isosceles right triangle on the coordinate plane.	2m 2m

Q.38.

Case Study – 3

While designing the school year book, a teacher asked the student that the length and width of a particular photo is increased by x units each to double the area of the photo. The original photo is 18cm long and 12cm wide.



Based on the above information, answer the following questions:

(i)	Write an algebraic equation depicting the above information.	1m
(ii)	Write the corresponding quadratic equation in standard form	1m
(iii)	(a)What should be the new dimensions of the enlarged photo?	2m
	OR	
(iii)	(b) Can any rational value of x make the new area equal to 220 cm^2?	2m

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