



DELHI PUBLIC SCHOOL NEWTOWN
SESSION 2023–24
FINAL EXAMINATION

CLASS: IX
SUBJECT: MATHEMATICS [SET A]

FULL MARKS: 80
TIME: $2\frac{1}{2}$ HOURS

Answers to this Paper must be written on a paper provided separately.

You will not be allowed to write during the first 15 minutes.

This time is to be spent in reading the question paper.

The time given at the head of this Paper is the time allowed for writing the answers.

Attempt all questions from Section A and any four questions from Section B.

The intended marks for questions or parts of questions are given in brackets [].

This paper consists of 5 printed pages.

SECTION A

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

Question 1

Choose the correct answers to the questions from the given options. (Do not copy the question, Write the correct answer only.) [15]

(i) The greatest among $2\sqrt{6}$, $6\sqrt{2}$, $\sqrt{12}$ and $4\sqrt{3}$ is:

- (a) $2\sqrt{6}$ (b) $6\sqrt{2}$ (c) $\sqrt{12}$ (d) $4\sqrt{3}$

(ii) The compound interest on ₹ 1200 for two years at the rate of 5% p.a. compounded annually is:

- (a) ₹ 60 (b) ₹ 120 (c) ₹ 123 (d) ₹ 125

(iii) Factors of $x^2 - (y - z)^2$ are :

- (a) $(x^2 + y^2)$ (b) $(x + y + z)(x - y - z)$ (c) $(x + y - z)(x - y + z)$ (d) $4xy$

(iv) The square of $a + \frac{1}{a}$ is:

- (a) $a^2 + \frac{1}{a^2} + 1$ (b) $a^2 + \frac{1}{a^2} + 2$ (c) $a^2 + \frac{1}{a^2}$ (d) $a^2 - \frac{1}{a^2}$

(v) The value of $\log 30 - \log 3$ is:

- a) 0 b) 1 c) 2 d) -1

(vi) The perimeter of a square, if its diagonal is $10\sqrt{2}$ cm is:

- a) 10 cm b) $40\sqrt{2}$ cm c) 20 cm d) 40 cm

(vii) If a ladder 13m long reaches a window 5m above the ground, then the distance of the foot of the ladder from the base of the wall is:

- a) 18m b) 12m c) 16m d) 14m

(viii) The line segments joining the midpoints of consecutive sides of a parallelogram form a:

- a) triangle b) kite c) trapezium d) parallelogram

(ix) A path of 7 m wide runs around outside a circular park whose radius is 18 m, the diameter of the outer circle is:

- a) 53m b) 70m c) 25m d) 50m

(x) In a ΔABC $\sin\left(\frac{A+B}{2}\right)$ will be:

- a) $\cos \frac{C}{2}$ b) $\sin \frac{C}{2}$ c) $\sin^2\left(\frac{A+B}{2}\right)$ d) $\cos \frac{(A+B)}{2}$

(xi) The coordinate of the point whose ordinate is - 4 and lies on y-axis is:

- a) (0, -4) b) (0, 4) c) (-4, 0) d) (4, -4)

(xii) The triangle and a rhombus are on the same base and between the same parallels, the ratio of the area of the triangle to the area of the rhombus is:

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

(xiii) The lateral surface area of a cube is 256 m^2 , its volume is:

- a) 512 m^3 b) 216 m^3 c) 64 m^3 d) 256 m^3

a) 33 b) 25 c) 30 d) 35

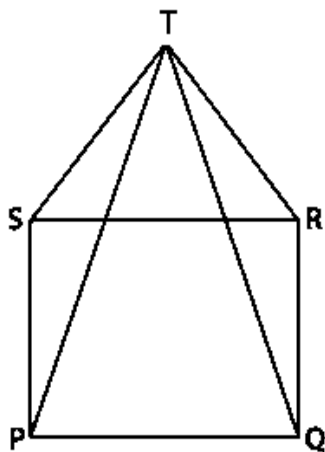
A diagram showing a triangle ABC . A line passes through vertices A and B . The line is extended to point D on one side and point E on the other. Angle CAD is labeled x and angle CBE is labeled y .

Reason (R): If two sides of a triangle are of length 4 cm and 2.5 cm then the third side cannot be 5.5 cm.

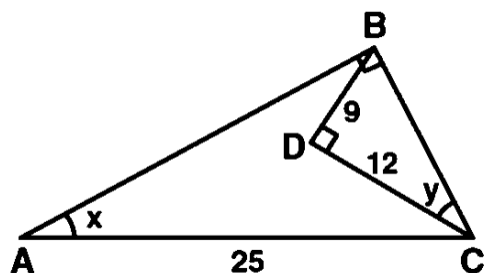
- ## Question 2

- ### Question 3

- [4]



- (ii) From the given figure find a) $\cos y^\circ$ b) $\tan x^\circ$ [4]



- (iii) Construct a frequency polygon for the following data. [use graph paper] [5]

Age in years	10-20	20-30	30-40	40-50	50-60	60-70
No. of Persons	3	6	8	9	5	2

SECTION B

(Attempt *any four* questions from this section)

Question 4

- (i) If $\left(\frac{2}{7}\right)^{-6} \times \left(\frac{2}{7}\right)^3 = \left(\frac{2}{7}\right)^{2x-1}$, find the value of x. [3]

- (ii) The altitude AD of $\triangle ABC$ is 12 cm long. If BD is 8 cm and DC is 18 cm, prove that $\angle BAC$ is right angle. [3]

- (iii) Abhay bought stamps of denominations ₹ 2 and ₹ 5 for ₹ 76. If he bought 20 stamps in all, find the number of stamps of each type. [4]

Question 5

- (i) If $\tan A = \frac{1}{\sqrt{3}}$ and $\tan B = \sqrt{3}$, find the value of $\sin A \cos B + \cos A \sin B$ [3]

- (ii) On what sum of money does the difference between the simple interest and compound interest for two years at 5% amount to ₹ 15? [3]

- (iii) A cubical tank of side 21 m contains water. A cube of side 10.5 m is completely merged into the water. Calculate the rise in the water level. (corrected up to two decimal places) [4]

Question 6

- (i) Solve for x when $\log_3(\log_2 2x) = \log 5 + \log 2$ [3]

- (ii) In triangle ABC, D is a point on BC (in between B and C). Prove that $AB + BC + AC > 2AD$. [3]

- (iii) In a trapezium ABCD, sides AB and DC are parallel to each other and E is the midpoint of AD. A line through E is drawn parallel to AB which intersects BC at F. Prove that $AB + DC = 2EF$. [4]

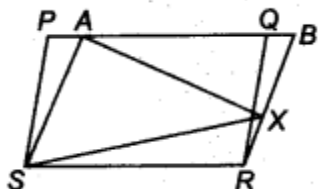
Question 7

(i) If the volume of a room is 792 m^3 and the area of the floor is 132 m^2 , find the lateral surface area of the room when sum of its length and breadth is 28 m. [3]

(ii) In figure, PQRS and ABRS are parallelograms and X is any point on side BR. Show that

(a) $\text{ar}(\text{PQRS}) = \text{ar}(\text{ABRS})$

(b) $\text{ar}(\text{AXS}) = \frac{1}{2} \text{ar}(\text{PQRS})$ [3]



(iii) The radius of a circle with centre at O is 13 cm. AB and CD are two parallel chords. The length of AB is 24 cm and distance between the chords is 17 cm, find the length of CD. [4]

Question 8

(i) Factorise: $11x^2 + 33x - 110$ [3]

(ii) Prove that the points with coordinates (7, 10), (-2, 5) and (3, -4) are the vertices of an isosceles triangle. [3]

(iii) If $x = \sqrt{3} - \sqrt{2}$, find the value of $x^2 - \frac{1}{x^2}$ [4]

Question 9

(i) If $2(x^2 + 1) = 5x$, find the value of $x^2 + \frac{1}{x^2}$. [3]

(ii) Prove that any point on the external angle bisector of a triangle is equidistant from the sides containing the angle. [3]

(iii) A race track is in the form of a ring, whose inner and outer circumferences are 88 m and 132 m respectively. Find the width of the track and also, its area. [4]

Question 10

(i) The sides of a triangular field are 15 m, 14 m and 13 m, Find the area of the triangle. [3]

(ii) The following observations 29, 32, 48, 50, x, x + 2, 72, 78, 84, 95 have been arranged in ascending order. If the median of the data is 63, find the value of x. [3]

(iii) ABCD is a square and P is point inside it. $\triangle ABP$ is an equilateral triangle. Find the measure of $\angle APB$, $\angle BPC$, $\angle PCD$ and reflex $\angle APC$. [4]