



**ICSE Board  
Class IX Mathematics  
Sample Paper 4**

**Time: 2½ hrs**

**Total Marks: 80**

**General Instructions:**

1. Answers to this paper must be written on the paper provided separately.
2. You will **NOT** be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper.
3. The time given at the head of this paper is the time allowed for writing the answers.
4. This question paper is divided into two Sections. Attempt **all** questions from **Section A** and any **four** questions from **Section B**.
5. Intended marks for questions or parts of questions are given in brackets along the questions.
6. All working, including rough work, must be clearly shown and should be done on the same sheet as the rest of the answer. Omission of essential working will result in loss of marks
7. Mathematical tables are provided.

**SECTION – A (40 Marks)**

*(Answer all questions from this Section)*

**Q. 1.**

(a) If  $\frac{3\sqrt{2} + 2\sqrt{3}}{5\sqrt{2} - 4\sqrt{3}} = x - y\sqrt{6}$ , find x. [3]

(b) How many bricks having dimensions 20 cm × 5 cm × 5 cm are required to make a wall 2.5 m long, 0.5 m broad and 5 m in height? [3]

(c) In two successive years interest on a certain sum at C.I. payable annually is Rs. 350 and Rs.420. Find the rate of interest. [4]

**Q. 2.**

(a) If  $a^2 - 3a + 1 = 0$ , find [4]

(i)  $a^2 + \frac{1}{a^2}$  (ii)  $a^3 + \frac{1}{a^3}$

(b) Factorise:  $20 - 45(m + n)^2$  [3]

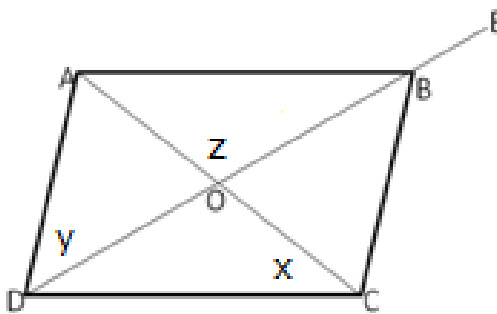
(c) Without using tables evaluate: [3]

$$\frac{5\sin 62^\circ}{\cos 28^\circ} - \frac{2\sec 34^\circ}{\operatorname{cosec} 56^\circ}$$

**Q. 3.**

(a) The perimeter of a square is  $4(p + 3q)$ . Find its area. [3]

(b) In figure below, ABCD is a rhombus in which the diagonal DB is produced to E. If  $m\angle ABE = 160^\circ$  then find x, y and z. [4]



(c) If  $x = 2^{\frac{1}{3}} + 2^{-\frac{1}{3}}$ , prove that  $2x^3 = 6x + 5$  [3]

**Q. 4.**

(a) Solve for a and b: [3]

$$\frac{\log(a-b)}{\log 5} = \frac{\log 4}{\log \frac{1}{2}} = \frac{\log(a+b)}{\log 2}$$

(b) AD is perpendicular to the side BC of an equilateral  $\triangle ABC$ . [4]  
Prove that  $4AD^2 = 3AB^2$ .

(c) Sum of the external angles of a regular polygon is  $\frac{1}{6}$  of the sum of interior angles.

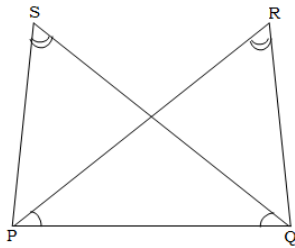
Find the number of sides. [3]

**SECTION – B (40 Marks)**

(Answer **any four questions** from this Section)

**Q. 5.** (a) Solve:  $3x - 7 = \frac{1}{y}$ ,  $x + \frac{1}{y} = 1$  [3]

(b) In the fig.,  $\angle R = \angle S$  and  $\angle RPQ = \angle PQS$ . Prove that  $PS = QR$ . [3]



(c) In an equilateral triangle with side a, prove that [4]

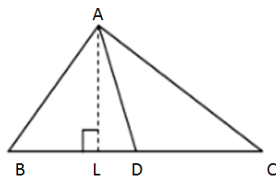
(i) Altitude =  $\frac{a\sqrt{3}}{2}$                       (ii) Area =  $\frac{\sqrt{3}}{4}a^2$

**Q. 6.** (a) The points A(4, -1), B(6, 0), C(7, 2) and D(5, 1) are the vertices of a rhombus. Is ABCD also a square? [3]

(b) Factorise:  $(e - y)^3 + (y - g)^3 + (g - e)^3$  [3]

(c) If  $\sin \theta = \frac{5}{13}$  where  $\theta < 90^\circ$ , find the value of  $\tan \theta + \frac{1}{\cos \theta}$  [4]

**Q. 7.** (a) Show that the median of a triangle divides it into two triangles of equal area. [3]

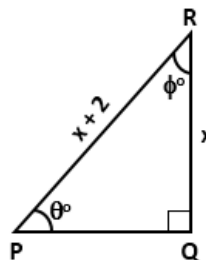


(b) In the figure of  $\Delta PQR$ ,  $\angle P = \theta^\circ$  and  $\angle R = \phi^\circ$  [3]

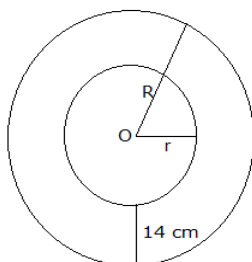
Find (i)  $(\sqrt{x+1}) \cot \phi$

(ii)  $(\sqrt{x^3 + x^2}) \tan \theta$

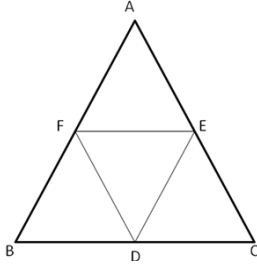
(iii)  $\cos \theta$



(c) A road, 14 m wide surrounds a circular ground whose circumference is 704 m Find the surface area of the road. Also, find the cost of paving the road at Rs. 100 per  $m^2$ . [4]



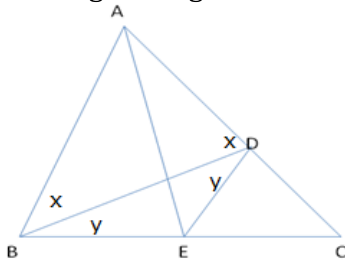
- Q. 8.** (a) In the  $\triangle ABC$ , D, E, F are the mid-points of BC, CA and AB respectively. Given AB = 5.8 cm EF = 6 cm and DF = 5 cm. Calculate BC and CA. [4]



- (b) Factorise:  $x^3 + y^3 + z^3 - 3xyz$  [3]

- (c) Padma invested Rs. 30,000 in a finance company and received Rs. 39,930 after  $1\frac{1}{2}$  years. Find the rate of interest per annum compound semi-annually. [3]

- Q. 9.** (a) In the given fig., AD = AB and AE bisects  $\angle A$ . Prove that: BE = ED. [3]



- (b) Find x,  $\frac{x-b-c}{a} + \frac{x-c-a}{b} + \frac{x-a-b}{c} = 3$ , if  $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} \neq 0$ . [3]

- (c) If two intersecting chords of a circle make equal angles with the diameter passing through their point of intersection, prove that the chords are equal. [4]

- Q. 10.** (a) The distribution of weight (in kg) of 40 students in a class is as given below: [6]

Weight (kg)	36-40	41-45	46-50	51-55	56-60	61-65
No. of students	3	6	5	10	9	7

- Draw a histogram for the distribution
- Draw a frequency polygon for the distribution

- (b) If the numerator of a fraction is increased by 2 and the denominator by 1, it becomes  $\frac{5}{8}$  and if the numerator and denominator of the same fraction are each increased by 1, the fraction becomes  $\frac{1}{2}$ . Find the fraction. [4]

- Q. 11.** (a) Construct a rectangle ABCD in which AB = CD = 5.2 cm and AC = BD = 5.7 cm and angle B measures 90 degrees. [3]

- (b) Using a scale of 1 cm = 1 unit on both axes, draw the graphs of the following equation:  
 $4x - y = 13$ ,  $5x + y = 14$  [4]

From the graph find,

- The co-ordinates of the point where two lines intersect
- The area of the triangle between the lines and the x-axis.

- (c) A rope is wound round the outside of a circular drum whose diameter is 70 cm and a bucket is tied to the other end of the rope. Find the number of revolutions made by the drum, if the bucket is raised by 11 m. [3]