

HALF YEARLY EXAMINATION: 2024-2025

CLASS : IX

SUBJECT : MATHEMATICS

NAME OF STUDENT:.....

MAX. MARKS: 80

DATE:

TIME: 3 HOURS

NOTE: 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.

Section: A [40marks]

(Attempt all questions from this Section)

Q1. Choose the correct answers to the questions from the given options:

[15]

(i) $\sqrt{10} \times \sqrt{15}$

- (a) $6\sqrt{5}$ (b) $5\sqrt{6}$
(c) $\sqrt{25}$ (d) $10\sqrt{5}$

(ii) The Compound Interest on Rs5000 at 20% per annum for $1\frac{1}{2}$ years Compounded half yearly is

- (a) Rs 6655 (b) Rs 1655
(c) Rs 1500 (d) Rs 1565

(iii) $(102)^2 - (98)^2$

- (a) 200 (b) 400
(c) 600 (d) 800

(iv) Factorization of $49p^3q - 36pq$ is

- (a) $p(7p+6q)$ (b) $q(7p-6)(7p+6)$
(c) $pq(7p+6)(7p-6)$ (d) none of these

(v) The value of $[5\frac{1}{16}]^{-3/4}$ is

- (a) $\frac{4}{9}$ (b) $\frac{9}{4}$
(c) $\frac{27}{8}$ (d) $\frac{8}{27}$

(vi) $\log_{10}(3x + 1) = 2$

- (a) $\frac{1}{3}$ (b) 99
(c) 33 (d) $\frac{19}{3}$

(vii) In a ΔABC , $AB = 3\text{cm}$, $BC = 4\text{cm}$ and $CA = 5\text{cm}$. If D and E are midpoints of AB and BC respectively, then the length of DE is

- (a) 1.5cm (b) 2cm
(c) 2.5cm (d) 3.5cm

(viii) In ΔABC , $AB = AC$ and $\text{angle } B = 50^\circ$. Then angle C is equal to

- (a) 40° (b) 50°
(c) 80° (d) 130°

(ix) If triangle PQR is right angled at Q, then

- (a) $PR = PQ$ (b) $PR < PQ$
(c) $PR < QR$ (d) $PR > PQ$

(x) If a ladder 10m reaches a window 8m above the ground, then the distance of the foot of the ladder from the base of the wall is

- (a) 18m (b) 8m
(c) 6m (d) 4m

(xi) If P and Q are any two points on a circle, then the line segment PQ is called a

- (a) radius of the circle (b) diameter of the circle
(c) chord of the circle (d) secant of the circle

(xii) Area of a triangle is 30cm^2 . If its base is 10cm , then its height is

- (a) 5cm (b) 6cm
(c) 7cm (d) 8cm

(xiii) Assertion(A): An equilateral triangle with side 10cm has area $25\sqrt{3}\text{cm}^2$.

Reason(R): Area of an equilateral triangle with side a units is $\frac{\sqrt{3}}{4} a^2$ units².

- (a) A is true, R is false (b) A is false, R is true
(c) Both A and R are true (d) Both A and R are false

(xiv) AD is a diameter of a circle and AB is a chord. If $AD = 34\text{cm}$ and $AB = 30\text{cm}$, then the distance of AB from the center of circle is

- (a) 17cm (b) 15cm
(c) 4cm (d) 8cm

(xv) After rationalising the denominator of $\frac{7}{3\sqrt{3}-2\sqrt{2}}$, we get the denominator as

- (a) 13 (b) 19
(c) 5 (d) 35

Q2.(i) What sum invested for $1\frac{1}{2}$ years compounded half yearly at the rate of 4% p.a. will amount to Rs 132651 ? [4]

(ii) The base of a right angled triangle is 12cm and its hypotenuse is 13cm long. Find its area and perimeter. [4]

(iii) If a and b are rational numbers and $\frac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} = a-b\sqrt{6}$, find the values of a and b . [4]

Q3.(i) Solve for x : $\log_{10}x = -2$ [4]

(ii) Calculate the length of a chord which is at a distance 6cm from the center of a circle of diameter 20cm . [4]

(iii) In an isosceles $\triangle ABC$, with $AB = AC$, the bisectors of angle B and angle C intersect each other at O . Show that (a) $OB = OC$ (b) OA bisects angle A . [5]

Section B [40 marks]

(Attempt any four questions from this Section.)

Q4.(i) If $a+b+c = 12$ and $ab+bc+ca = 22$, find $a^2+b^2+c^2$. [3]

(ii) If $\sin\theta = \frac{6}{10}$, find the value of $\cos\theta + \tan\theta$. [3]

(iii) Evaluate: $2 \log 5 + \log 8 - \frac{1}{2} \log 4$. [4]

Q5.(i) Prove that $\sqrt{3}$ is an irrational number. [3]

(ii) Factorise: $64x^3 + 1$ [3]

(iii) The length of a rectangular hall is 5m more than its breadth. If the area of the hall is 594m^2 , find its perimeter. [4]

Q6.(i) If $\sin\theta + \operatorname{cosec}\theta = 2$, find the value of $\sin^2\theta + \operatorname{cosec}^2\theta$. [3]

(ii) The cost of a refrigerator is Rs 9000 . Its value depreciates at the rate of 5% every year. Find the total depreciation in its value at the end of 2 years. [3]

(iii) AB and CD are two parallel chords of a circle of lengths 10cm and 4cm respectively. If the chords lie on the same side of the center and the distance between them is 3cm , find the diameter of the circle. [4]

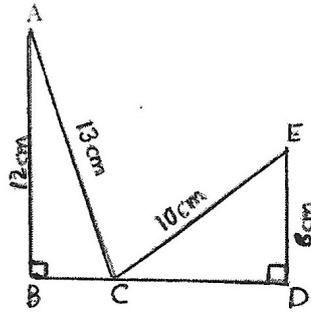
Q7.(i) Insert two rational numbers between $\frac{1}{3}$ and $\frac{1}{4}$. [3]

(ii) In how many years will Rs 4000 amount to Rs 5324 at 10% compound interest? [3]

(iii) The area of a circular ring enclosed between two concentric circles is 286cm^2 . Find the radii of the two circles, given that their difference is 7cm . Take $\pi = \frac{22}{7}$ [4]

Q8.(i) Find the value of: $\cos^2 60^\circ + \sec^2 30^\circ + \tan^2 45^\circ$. [3]

(ii) In the given figure $AB = 12\text{cm}$, $AC = 13\text{cm}$, $CE = 10\text{cm}$ and $DE = 6\text{cm}$. Calculate the length of BD . [3]



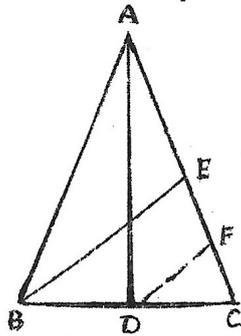
(iii) If $3^{x+1} = 9^{x-2}$, find the value of 2^{1+x} . [4]

Q9.(i) If $3 \tan^2 \theta - 1 = 0$, find $\cos 2\theta$, given that θ is acute. [3]

(ii) The mean of 5 numbers is 20. If one number is excluded, mean of the remaining numbers becomes 23. Find the excluded number. [3]

(iii) In the adjoining figure, AD and BE are medians of $\triangle ABC$. [4]

If $DF \parallel BE$, prove that $CF = \frac{1}{4} AC$



Q10.(i) Insert two irrational numbers between $\sqrt{3}$ and $\sqrt{7}$. [3]

(ii) Express $\log_{10} 2 + 1$ in the form $\log_{10} x$. [3]

(iii) D is any point on the side AC of a $\triangle ABC$ with $AB = AC$. Show that $CD < BD$ [4]

END