

Half Yearly Examination 2020

CLASS IX

MATHEMATICS

MM:80

Time:2 hrs.

Note: You will not be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper. Attempt all question from section A and any three questions from section B. All working including rough work, must be clearly shown on the same sheet.

SECTION A (40 marks)

Answer all the questions from this section

Q.1(a) Find the value of : $2.\overline{6} - 0.\overline{9}$ (3)

(b) Find the amount of Rs. 256 in one year at 12.5% per annum when the interest is compounded half yearly. (3)

(c) Find the value of $x^3 - 1/x^3$, if

(i) $x - 1/x = 6$ (ii) $x + 1/x = \sqrt{29}$ (4)

Q.2(a) Factorise (3)

i. $(1-x^2)(1-y^2) + 4xy$

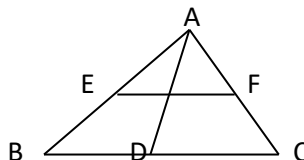
ii. $A^2 + 1/A^2 - 18$

(b) The side BC of a triangle ABC is produced to D. So that CD = AC. If the angle BAD = 109 deg and angle ACD = 72 deg. Prove that BC is greater than AC .(3)

(c) Find the area of a triangle with base 5cm and whose height is equal to that of a rectangle with base 5cm and area 20cm^2 . (4)

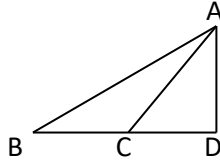
Q.3(a) find each angle of parallelogram if two consecutive angles are in the ratio of 1:5 . (3)

(b) In given figure, D,E& F are the mid-points of BC, CA and AB respectively : (3)
prove : AD bisects EF.



(c) Solve : $3x - 5y = 14$, $2x - 7y = 2$

Q.4(a)In the given figure: AB = 8cm, BC = 6cm, AC = 3cm and ADC = 90 deg. Calculate CD [3]



(b) A circular field has a perimeter of 650m. A plot in the shape of a square having its vertices on the circumference of the field is marked. Calculate the area of the square plot. (3)

(c) If $a+b+c = 0$, show $a^3+b^3+c^3 = 3abc$ (4)

Section B (40 marks)

Answer any three question from this section

Q.5(a) Factorise :

(i) $x^2 + 1/x^2 - 11$

(ii) $(2a+b)^3 + (a+2b)^3$

(b) Prove that

$$\frac{1}{\sqrt{2}-1} + \frac{2}{\sqrt{3}+1} = \sqrt{2} + \sqrt{3}$$

(c) On what sum of money does the difference between the simple interest and compound interest in 2 years at 5% per annum is Rs. 15 ?

Q6(a) In a class of 60 boys , the marks obtain in monthly test were as under

Marks	10-20	20-30	30-40	40-50	50-60
Students	10	25	12	8	5

Draw a frequency polygon to represent the above data.

(b) Solve the following pair of equations by the method of cross multiplication.

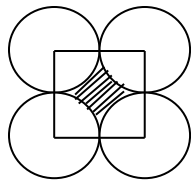
$$2x+3y = 9, 3x+4y = 5$$

(c) In the equilateral triangle with side 'a' prove that :

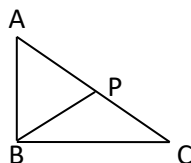
(i) altitude = $(a\sqrt{3})/2$

(ii) area of triangle = $\frac{\sqrt{3}}{4} \times a^2$

Q7(a) Here in figure A,B,C & D are the centres of equal circles which touch externally in pairs and ABCD is a square of side 14cm. Find the area of the shaded region .



(b) ABC is a right angled triangle angle B = 90 deg & mid pt. of AC is P . Prove that PA = PB = $\frac{1}{2}$ AC .



(c) Find the value of a & b if

$$\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a + b\sqrt{3}$$

Q8.(a) Find 7 rational numbers between $\frac{1}{3}$ and $\frac{1}{2}$.

(b) A sum of money gets doubled in 5 years. How many times it will be in 20 years ? Take sum be Rs. 12000

(c) Find the value of :

$$27a^3 + 108a^2b + 144ab^2 + 64b^3, \text{ if } a = 2, b = 3.$$

Q9.(a) When the numerator of a fraction is increased by 4, the fraction increases by $\frac{2}{3}$. What is the denominator of the fraction ?

(b) Quadrilateral ABCD is a rhombus. P, Q, R, & S are the mid points of AB, BC, CD and DA respectively. Prove that PQRS is a rectangle.

(c) Solve

$$\frac{5}{x+y} - \frac{2}{x-y} = -1$$

$$\frac{15}{x+y} + \frac{7}{x-y} = 10$$

Q10.(a) How long will a boy take to go four rounds of a circular field whose radius is 35m, walking at 5km per hour.

(b) The class marks of a distribution are 11, 15, 19, 23, 27, 31, 35. Determine the class size and class boundaries.(3)

(c) Find the value of :

$$\frac{(x+y)^2}{xy} + \frac{(y+z)^2}{yz} + \frac{(z+x)^2}{zx}, \text{ if } x^3+y^3+z^3 = 3xyz \text{ \& } x+y+z = 0$$

$$x-x-x$$