CBSE Class 9 Maths Sample Paper SA 1

SUBJECT: MATHEMATICS **MAX. MARKS : 80**

CLASS : IX **DURATION : 3 to 3 $\frac{1}{2}$ hours**

General Instruction:

(i) **All** questions are compulsory.

(ii) This question paper contains **30** questions divided into four Sections A, B, C and D.

(iii) **Section A** comprises of 8 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 10 questions of **3 marks** each and **Section D** comprises of 10 questions of **4 marks** each.

(iv) There is no overall choice. However, an internal choice has been provided in one question of 2 marks, three questions of 3 marks each and two questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of Calculators is not permitted

SECTION – A

Q.1 If $x^2 + kx + 6 = (x + 2)(x + 3)$ for all x, the value of k is

(A) 1 (B) -1 (C) 5 (D) 3

Q.2 $p(x)= 2x^4 - 3x^3 + 2x^2 + 2x - 1$ is divided by (x-2) and $q(x)= 3x^3 - 2x^2 + x - 1$ is divided by (x-1). So, twice the sum of the remainders is:

(A) 21 (B) 35 (C)54 (D) 40

Q.3 In ΔABC and ΔDEF, AB = DF and $\angle A = \angle D$. The two triangles will be congruent by SAS axiom if:

(A) BC = EF (B) AC = DE (C) BC = DE (D) AC = EF

Q. 4 If a straight line falling on two straight lines makes the interior angles on the same side of it, whose sum is 120^0, then the two straight lines, if produced indefinitely, meet on the side on which the sum of angles is

(A) less than 120^0

(B) greater than 120^0

(C) is equal to 120^0

(D) greater than 180^0

Q.5 The lengths of a triangle are 6 cm, 8 cm and 10 cm. Then the length of perpendicular from the opposite vertex to the side whose length is 8cm is:

(A) 5 cm
(B) 4 cm
(C) 6 cm
(D) 2 cm

Q.6 If $\left(\sqrt{5}+\sqrt{6}\right)^2$ = a + b $\sqrt{30}$ then a and b respectively are

(A) 12 and 2
(B) $\sqrt{5}$ and $\sqrt{6}$
(C) 11 and 2
(D) 10 and $2\sqrt{30}$

Q.7 The sides of a triangular park are in the ratio of 2: 6: 7 and its perimeter is 300 m. Then its area is:

(A) $154\sqrt{57}$ cm^2
(B) $215\sqrt{45}$ cm^2
(C) $340\sqrt{56}$ cm^2
(D) $300\sqrt{55}$ cm^2

Q.8 The area of a rectangle is $x^2+9x+14$, what are the dimensions of rectangle if x=2.
Options:
(A)14 and 2
(B)6 and -6
(C)9 and 4
(D)18 and 2

SECTION – B

Q.9 Evaluate: $\sqrt[3]{(343)^{-2}}$

Q.10 In the fig.1, sides QP and RQ of ΔPQR are produced to points S and T respectively. If ∠SPR = 135° and ∠PQT = 110°, find ∠PRQ.

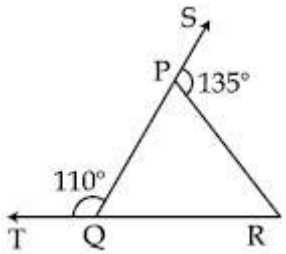


Fig. 1

Q.11 Factorise: $7\sqrt{2}x^2 - 10x - 4\sqrt{2}$

Q.12 If a + b + c = 7 and ab + bc + ca = 20, find the value of $a^2 + b^2 + c^2$.

Q.13 In fig.2, AB||CD then find the value of x.

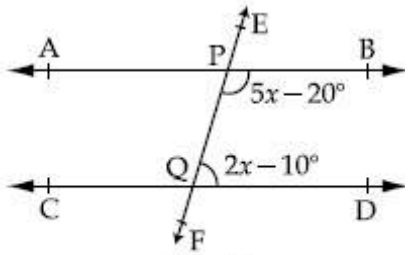
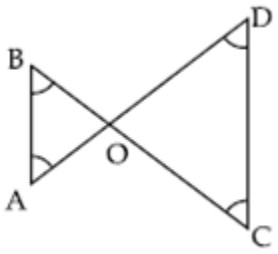


Fig. 2

OR

In fig, ∠B < ∠A and ∠C < ∠D show that AD < BC.



Q.14 See fig.4, and write the following:

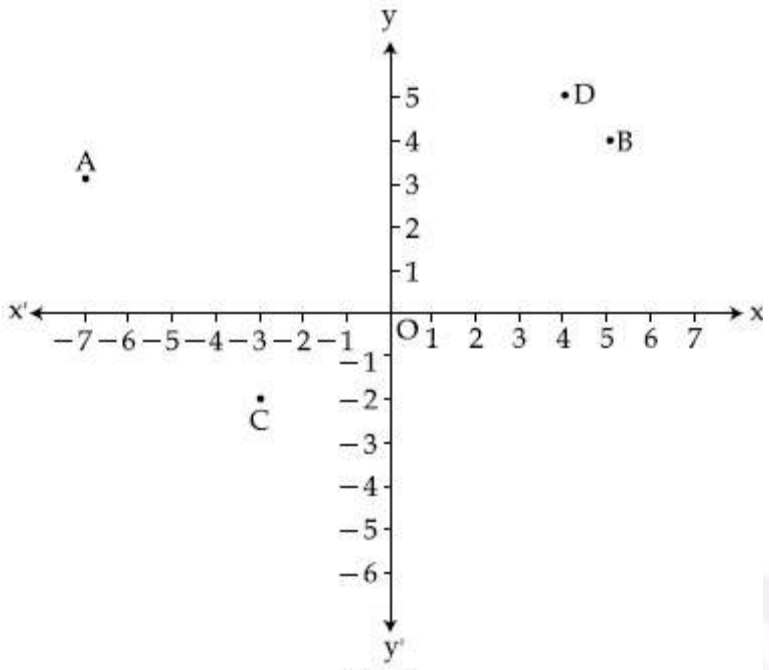


Fig. 4

(i) Co – ordinates of point A

(ii) Abscissa of point D

(iii) The point indentified by the co – ordinates (5,4)

(iv) Co – ordinates of point C

SECTION – C

Q.15 If $x = \left(3 + \sqrt{8}\right)$, find the value of $\left(x^2 + \frac{1}{x^2}\right)$.

OR

Express $5.3\overline{47}$ in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$.

Q.16 Factorize $(x - 3y)^3 + (3y - 7z)^3 + (7z - x)^3$

Q.17 Factorise: $2\sqrt{2}a^3 + 8b^3 - 27c^3 + 18\sqrt{2}abc$.

Q.18 In fig.5, ΔABC, is an isosceles triangle in which AB = AC, side BA is produced to D such that AD = AB. Show that ∠BCD is a right angle.

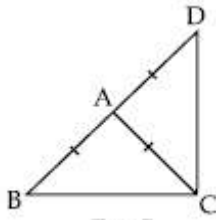


Fig. 5

Q.19 In fig.6, D is a point on side BC of ΔABC such that AD = AC. Show that AB > AD.

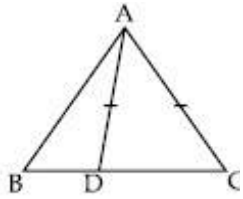


Fig. 6

Q.20 A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 15 cm, 14 cm and 13 cm and the parallelogram stands on the base 15 cm, find the height of parallelogram.

Q.21 In the fig.7, ∠X = 72°, ∠XZY = 46°. If YO and ZO are bisectors of ∠XYZ and ∠XZY respectively of ΔXYZ, find ∠OYZ and ∠YOZ.

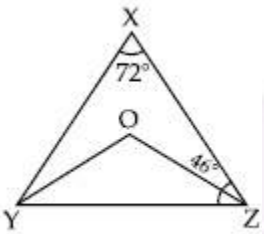


Fig. 7

Or

In fig.8, AD and CE are the angle bisectors of ∠A and ∠C respectively. If ∠ABC = 90° then find ∠AOC.

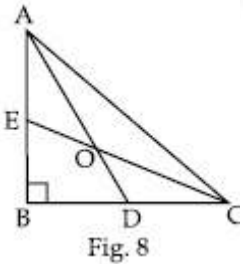


Fig. 8

Q.22 In ΔABC, BE and CF are altitudes on the sides AC and AB respectively such that BE = CF. Using RHS congruency rule, prove that AB = AC.

Q.23 Find the value of a and b if $\frac{\sqrt{11}+\sqrt{7}}{\sqrt{11}-\sqrt{7}} = a - \sqrt{77}b$.

OR

If $\frac{2}{\sqrt{3}+\sqrt{5}} + \frac{5}{\sqrt{3}-\sqrt{5}} = a\sqrt{3} + b\sqrt{5}$, find a and b.

Q.24 Find the area of a square the coordinates of whose vertices are (0,0),(2,0),(2,2) and (0,2).

SECTION – D

Q.25. Find the values of a and b if:

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

Or

If $a = 7 - 4\sqrt{3}$, find the value of $\sqrt{a} + \frac{1}{\sqrt{a}}$

Q.26 The polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by (x + 1) leaves the remainder 19. Find the value of a. Also find the remainder, when p(x) is divided by x + 2.

Or

Find the values of a and b so that (x + 1) and (x – 1) are factors of

$x^4+ax^3-3x^2+2x+b$.

Q.27 Prove "If two lines intersect each other, then the vertically opposite angles are equal".

Q.28 In the fig.9, the sides AB an AC of ΔABC are produced to point E and D respectively. If bisectors BO and CO of ∠CBE and ∠BCD respectively meet at point O, then prove that

$\angle BOC = 90° - \frac{1}{2}\angle BAC$.

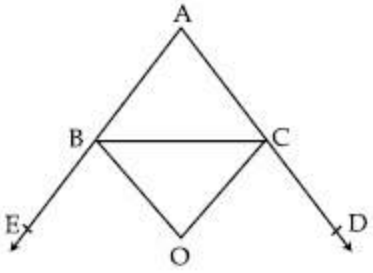


Fig. 9

Q.29 (i) Multiply $9x^2 + 25y^2 + 15xy + 12x - 20y + 16$ by $3x - 5y - 4$ using suitable identity.

(ii) Factorise: $a^2 + b^2 - 2(ab - ac - bc)$.

Q.30 In the fig.10, D and E are points on the base BC of a ΔABC such that AD = AE and ∠BAD = ∠CAE. Prove that AB = AC.

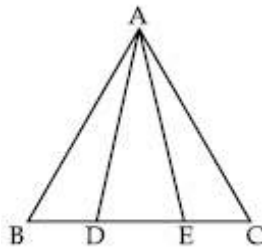


Fig. 10

Q.31 Find the value of:

$$\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2}$$

Q.32 Factorize: $\frac{1}{27}(2x+5y)^3 + \left(-\frac{5}{3}y + \frac{3}{4}z\right)^3 - \left(\frac{3}{4}z + \frac{2}{3}x\right)^3$

Q.33 Find the perimeter of a triangle whose vertices are (0,4),(3,0) and (-3,0).

Q.34 (i)In triangle ABC, AB = BC; angle B is half of angle A. Is AB >AC? Give reason for your answer

(ii) The sides of AB, BC, AC a triangle ABC are 2.8 cm, 3.7 cm and 4.1 cm respectively. What is the relation ship between the angles A, B, and C?