

Solved sample paper
Subject: Maths
Summative Assessment I

Class: IX

Time : 2½ hours

MM:80 marks

General Instructions:

- (i) All questions are compulsory.
- (ii) The question paper consists of 34 questions divided into 4 sections. A, B, C and D. 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.
- (iii) Question numbers 1 to 8 in section-A are multiple choice questions where you are to select one correct option out of the given four.
- (iv) There is no overall choice. However, internal choice has been provided in 1 question of two marks. 3 questions of three marks each and 2 questions of four marks each. You have to attempt only of the alternatives in all such questions.
- (v) Use of calculator is not permitted.

Section - A

Q.1 Which of the following is an irrational number?

- (a) 3.14 (b) $3.\overline{14}$ (c) $3.1\overline{4}$ (d) 3.141141114

Q.2 The zeros of the polynomial $p(x) = x^2 + x - 6$ are

- (a) 2,3 (b) -2, 3 (c) 2,-3 (d) -2, -3

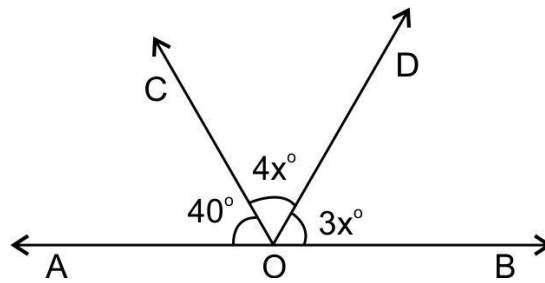
Q.3 The value of k, for which the polynomial $x^3 - 3x^2 + 3x + k$ has 3 as its zero, is

- (a) -3 (b) 9 (c) -9 (d) 12

Q.4 When $(x^{31} + 31)$ is divided by $(x + 1)$, the remainder is

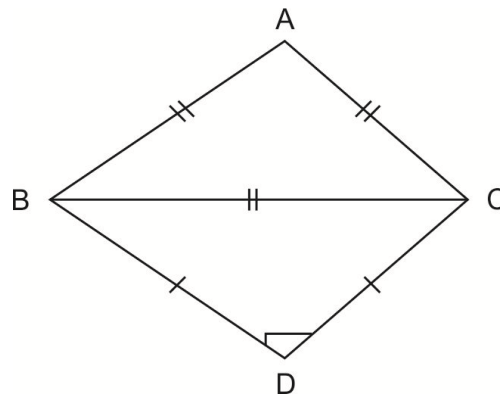
- (a) 0 (b) 1 (c) 30 (d) 31

- Q.5 In the given figure, AOB is a straight line. If $\angle AOC = 40^\circ$, $\angle COD = 4x^\circ$ and $\angle BOD = 3x^\circ$ then $\angle COD =$



- (a) 80° (b) 100° (c) 120° (d) 140°
- Q.6 In the figure ABC is an equilateral triangle and BDC is an isosceles right triangle, right angled at D, $\angle ABD$ equals.

- (a) 45° (b) 60° (c) 105° (d) 120°



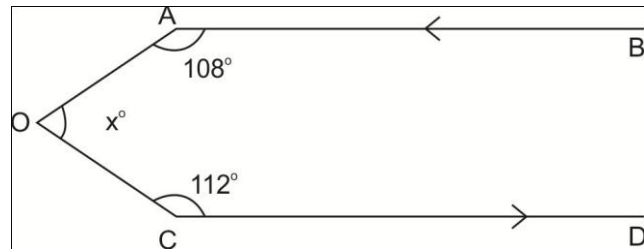
- Q.7 The perimeter of an equilateral triangle is 60m. The area is
 (a) $100\sqrt{3} m^2$ (b) $10\sqrt{3} m^2$ (c) $15\sqrt{4} m^2$ (d) $20\sqrt{3} m^2$
- Q.8 In a $\triangle ABC$ it is given that base = 12cm and height = 5cm its. area is
 (a) $60cm^2$ (b) $30 cm^2$ (c) $15\sqrt{3} cm^2$ (d) $45 cm^2$

Section - B

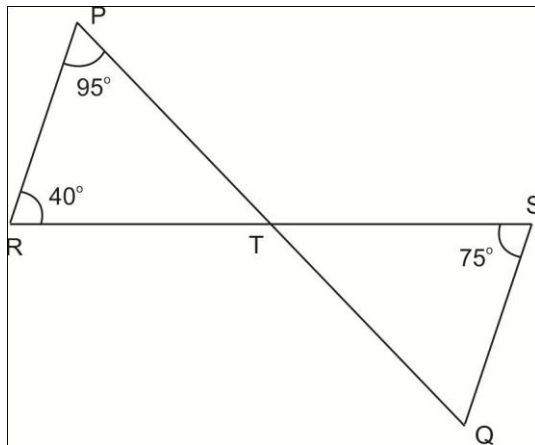
Question numbers 9 to 14 carry 2 marks each.

- Q.9 Express $0.\overline{36}$ as a fraction in simplest form.
- Q.10 If $2x + 3y = 13$ and $xy = 6$ find the value of $8x^3 + 27y^3$
- Q.11 Locate $\sqrt{5}$ on the number line.

Q.12 Find the value of x in the adjoining figure if $AB \parallel CD$.



Q.13 In the given figure if lines PQ and RS intersect at point T such that $\angle PRT = 40^\circ$, $\angle RPT = 95^\circ$ and $\angle TSQ = 75^\circ$ find $\angle SQT$



OR

The exterior angles, obtained on producing the base of a triangle both ways are 104° and 136° . Find all the angles of the triangle.

Q.14 In which quadrant will the point lie, if

- (i) The y coordinate is 3 and x coordinate is -4?
- (ii) The x coordinate is -5 and the y coordinate is -4?

Section - C

Question numbers 15 to 24 carry 3 marks each.

Q.15 Find three rational numbers lying between $\frac{1}{5}$ and $\frac{1}{4}$

Q.16 Rationalize the denominator of $\frac{6}{3+\sqrt{2}}$

Q.17 Factorise $27x^3 + y^3 + z^3 - 9xyz$.

$$\begin{aligned} \text{(ii)} \quad & \left(\frac{3}{2}x\right)^3 + (1)^3 + 3 \times \left(\frac{3}{2}x\right)^2 \times 1 + 3 \times \frac{3}{2}x \times 1^2 \\ &= \frac{27}{8}x^3 + 1 + \frac{27}{4}x^2 + \frac{9x}{2} \end{aligned}$$

OR

$$\text{If } a + b + c = 0 \text{ then } a^3 + b^3 + c^3 = 3abc$$

$$= 3 \times \frac{1}{4} \times \frac{1}{3} \times \frac{-7}{12} = \frac{-7}{48}$$

Q.30 (i) If equals are added to equals the wholes are equal.

(ii) The whole is greater than the part.

Postulates (i) A terminated line can be produced indefinitely.

(ii) All right angles are equal to one another.

$$\text{Q.31 } \angle QPR = 180^\circ - (75^\circ + 32^\circ) = 73^\circ$$

$$\angle QPS = 73 \times \frac{1}{2} = 36.5^\circ$$

$$\angle QPT = 15^\circ, \angle TPS = 21.5^\circ$$

$$\text{Q.32 } \angle ROQ = 90^\circ, \angle ROS + \angle SOP = \angle ROQ$$

$$\angle ROS + \angle ROS = \angle ROQ + \angle ROS - \angle SOP$$

$$\text{So } \angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$$

Q.33 In ΔOBC

$$\angle OBC + \angle OCB + \angle BOC = 180^\circ$$

$$\angle OBC + \angle OCB = 180^\circ - \angle BOC$$

$$\Delta ABC, \frac{1}{2}(\angle A + \angle B + \angle C) = 90^\circ$$

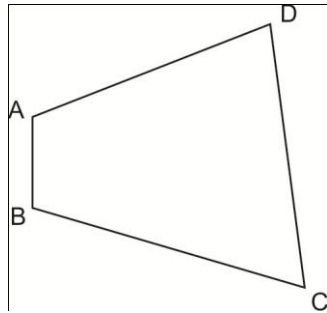
$$\text{So, } \frac{1}{2}(\angle B + \angle C) = 90^\circ - \frac{1}{2}\angle A$$

$$\text{So, } 180^\circ - \angle BOC = 90^\circ - \frac{1}{2}\angle A$$

$$\angle BOC = 90^\circ + \frac{1}{2}\angle A$$

OR

In figure AB and CD are respectively the smallest and the longest sides of a quadrilateral ABCD. Show that $\angle A > \angle C$



Q.24 Find the area of a triangle, two sides of which are 8cm and 6cm and the perimeter is 24cm.

Section - D

Question number 25 to 34 carry 4 marks each.

Q.25 Simplify $\left(\frac{64}{125}\right)^{-2/3} + \left(\frac{256}{625}\right)^{-1/4} + \left(\frac{3}{7}\right)^0$

Q.26 Represent $\sqrt{9.3}$ on the number line

OR

Visualise $4.\overline{26}$ on the number line upto 4 decimal places.

Q.27 Find the value of a if $x + a$ is a factor of $p(x) = x^3 + ax^2 - 2x + a + 4$

Q.28 Using factor theorem factorize the polynomial $x^3 - 6x^2 + 11x - 6$

Q.29 Expand using suitable Identity.

(i) $(2x + 3y + 2z)^2$

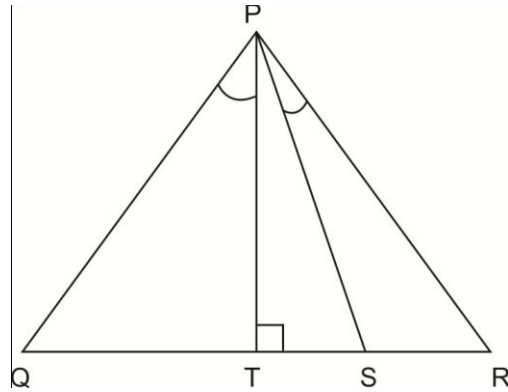
(ii) $\left[\frac{3}{2}x + 1\right]^3$

OR

Without finding the cubes, factorise and find the value of $\left(\frac{1}{4}\right)^3 + \left(\frac{1}{3}\right)^3 - \left(\frac{7}{12}\right)^3$

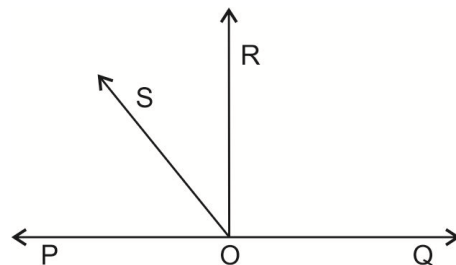
Q.30 Write any two Euclid's postulates and two axioms.

Q.31 In the given figure $PT \perp QR$ and PS bisects $\angle QPR$. If $\angle Q = 75^\circ$ and $\angle R = 32^\circ$ find $\angle TPS$



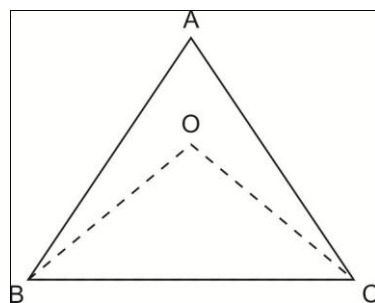
Q.32 In the figure given below POQ is a line OR is perpendicular to line PQ; OS is another ray lying between rays OP and OR prove that

$$\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$$



Q.33 In the figure the bisectors of $\angle ABC$ and $\angle BCA$ intersect each other at the point O.

Prove that $\angle BOC = 90^\circ + \frac{1}{2}\angle A$



Q.34 Plot the point (1,2), (3,-4), (-4,-7) and (-2,2) on the graph paper.

Sample Paper SA -1

Marking Scheme

Section - A

Q.1 (d) Q.2 (c) Q.3 (c) Q.4 (c)

Q.5 (a) Q.6 (c) Q.7 (a) Q.8 (b)

Q.9 Let $y = 0.\overline{36}$ -----(i)

$$100y = 36.\overline{36} \text{ ----- (ii)}$$

Subtracting (i) from (ii)

$$100y - y = 36 - 0$$

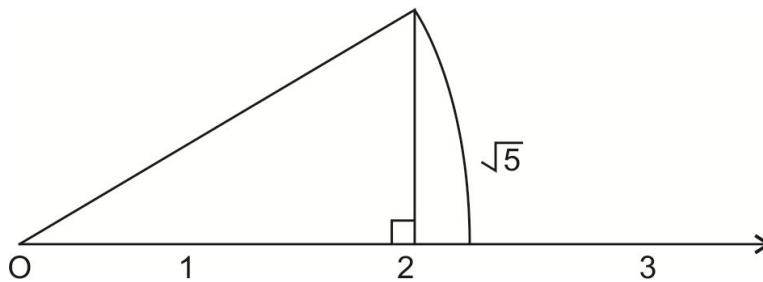
$$y = \frac{4}{11}$$

Q.10 $8x^3 + 27y^3 = (2x + 3y)(4x^2 + 9y^2 - 6xy)$

$$= (2x + 3y)[(2x + 3y)^2 - 18xy]$$

$$= 13 [169 - 108] = 793$$

Q.11 $\sqrt{5} = \sqrt{2^2 + 1^2}$



Q.12 Draw $OE \parallel AB$

then $OE \parallel CD$

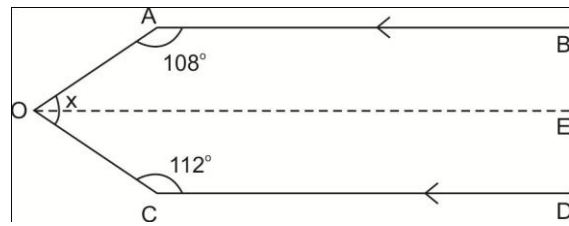
$AB \parallel OE$

$$108 + \angle AOE = 180^\circ \text{ (angle on same side of transversal)}$$

$$\angle AOE = 72^\circ$$

$$\angle EOC = 68^\circ$$

$$x = 140^\circ$$

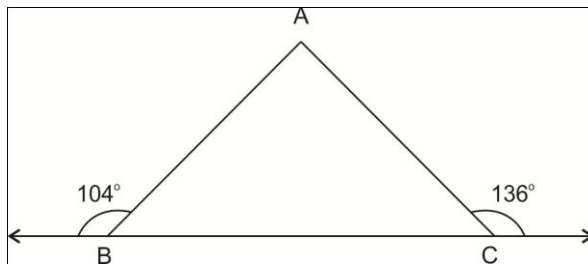


Q.13 $\angle PTR = 180^\circ - (95^\circ + 40^\circ)$ equals to 45°

$$\angle STQ = 45^\circ$$

$$\angle SQT = 180^\circ - (45^\circ + 75^\circ)$$
 equals to 60°

OR



$$\angle ABC = 76^\circ, \angle ACB = 44^\circ, \angle BAC = 180^\circ - (76^\circ + 44^\circ) = 60^\circ$$

Q.14 (i) $(-4,3)$ II quadrant (ii) $(-5,-3)$ III quadrant

Q.15 $\frac{1}{5}$ and $\frac{1}{4}$

$$\frac{1 \times 4}{5 \times 4} \text{ and } \frac{1 \times 5}{4 \times 5}$$

and so on

Q.16 $\frac{6}{3+\sqrt{2}} \times \frac{3-\sqrt{2}}{3-\sqrt{2}}$

$$\frac{6(3-\sqrt{2})}{7}$$

Q.17 $27x^3 + y^3 + z^3 - 9xyz$

$$= (3x)^3 + y^3 + z^3 - 3 \cdot 3x \cdot y \cdot z$$

$$= (3x + y + z)(9x^2 + y^2 + z^2 - 3xy - yz - 3zx)$$

Q.18 $x = -5$ using factor theorem we get value $p(x) = 0$

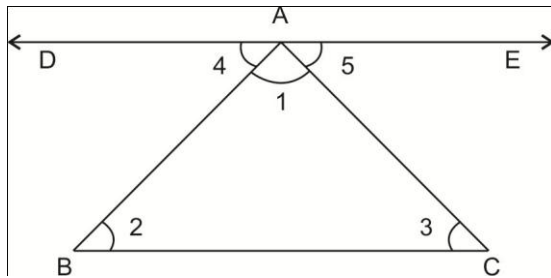
so $x + 5$ is a factor of $2x^3 + 9x^2 - 11x - 30$

Q.19 $AC + CB = AB$

$$2AC = AB$$

$$AC = \frac{1}{2}AB$$

Q.20



Given - A triangle ABC

To Prove $\angle 1 + \angle 2 + \angle 3 = 180^\circ$

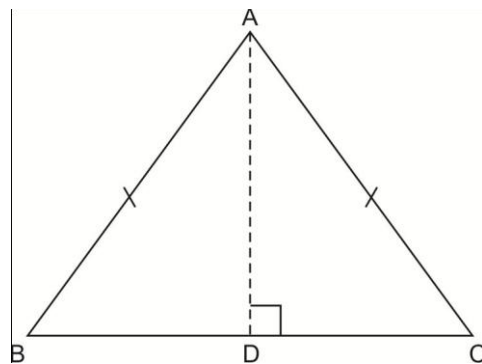
Construction : draw a line $DE \parallel BC$

Proof : by figure $\angle 2 = \angle 4$, $\angle 3 = \angle 5$

So $\angle 2 + \angle 3 = \angle 4 + \angle 5$, $\angle 1 + \angle 2 + \angle 3 = \angle 1 + \angle 4 + \angle 5$

So $\angle 1 + \angle 2 + \angle 3 = 180^\circ$

OR



Given $AB = AC$

To Prove : $\angle C = \angle B$

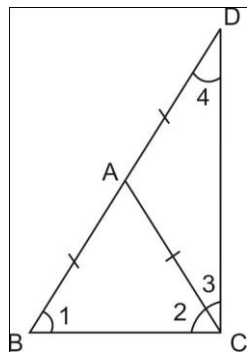
Construction : Draw the bisector AD of $\angle A$

Proof : In triangles ABD and ACD

$AB = AC$ (given), $\angle BAD = \angle DAC$, $AD = AD$ So $\triangle ABD \cong \triangle ADC$ Hence $\angle B = \angle C$

Q.21 $x = 50^\circ$, $y = 80^\circ$

Q.22.



$$\angle 1 = \angle 2, \angle 4 = \angle 3 \text{ So } \angle 1 + \angle 4 = \angle 2 + \angle 3$$

In $\triangle BCD$

$$\angle 1 + \angle 2 + \angle 3 + \angle 4 = 180^\circ, 2(\angle 2 + \angle 3) = 180^\circ, \angle 2 + \angle 3 = 90^\circ$$

Q.23 In $\triangle ADE$

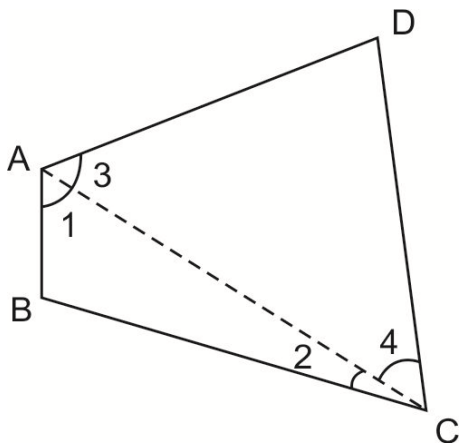
$$AD = AE$$

$$\angle ADE = \angle AED, \angle ADB = \angle AEC$$

In $\triangle ABD$ & $\triangle ACE$

$$AD = AE, BD = CE, \angle ADB = \angle AEC \text{ So } \triangle ABD \cong \triangle ACE$$

OR



In $\triangle ABC$

$$\angle 1 > \angle 2$$

$$\text{In } \triangle ADC, \angle 3 > \angle 4, \text{ So } \angle 1 + \angle 3 > \angle 2 + \angle 4, \text{ So } \angle A > \angle C$$

Q.24 Third side of triangle = 10 cm

$$S = 12cm$$

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

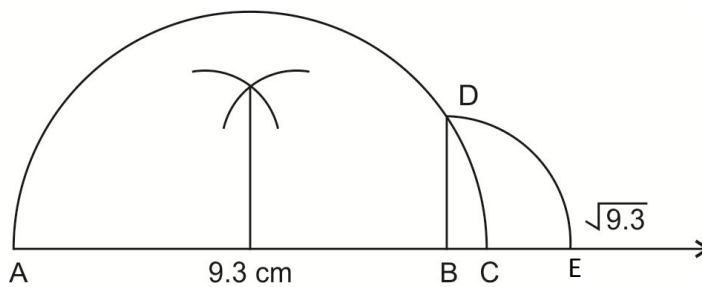
$$\sqrt{12 \times 4 \times 6 \times 2} = 24cm^2$$

Q.25 $\frac{4^{-2}}{5^{-2}} + \frac{4^{-1}}{5^{-1}} + 1$

$$\frac{5^2}{4^2} + \frac{5}{4} + 1$$

$$= \frac{61}{14}$$

Q.26



$$BD=BE=\sqrt{9.3}$$

Q.27 $P(-a) = 0$

$$-a + 4 = 0$$

$$a = 4$$

Q.28 Let $p(x) = x^3 - 6x^2 + 11x - 6$

$$p(1) = 0$$

$$(x - 1) \text{ is factor of } p(x)$$

Now divide $p(x)$ by $x - 1$ we get $x^2 - 5x + 6$ as other factor now factorise this we get $(x - 2)$ and $(x - 3)$ as other factors.

Q.29 (i) $\{(2x)^2 + (3y)^2 + (2z)^2 + 2 \times 2x \times 3y + 2 \times 3y \times 2z + 2 \times 2x \times 2z\}$

$$= 4x^2 + 9y^2 + 4z^2 + 12xy + 12yz + 8xz$$

$$\begin{aligned} \text{(ii)} \quad & \left(\frac{3}{2}x\right)^3 + (1)^3 + 3 \times \left(\frac{3}{2}x\right)^2 \times 1 + 3 \times \frac{3}{2}x \times 1^2 \\ &= \frac{27}{8}x^3 + 1 + \frac{27}{4}x^2 + \frac{9x}{2} \end{aligned}$$

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$$\angle BOC = 90^\circ + \frac{1}{2}\angle A$$

Q.34

