TERM-1
SAMPLE PAPER
CLASS-IX

(2023 -24)

MATHS

Sample Question Paper (2023-24)

Mathematics

Class - IX

Maximum marks : 80 **Time allowed : 3 hours**

General Instructions:

- **This Question Paper has 5 Sections A-E.**
- **Section A has 20 MCQs carrying 1 mark each.**
- **Section B has 5 questions carrying 02 marks each.**
- **Section C has 6 questions carrying 03 marks each.**
- **Section D has 4 questions carrying 05 marks each.**
- **Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.**

All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided.
An internal choice has been provided in the 2 marks questions of Section E.
Draw neat figures(using scale and pencil) wherever required. Take π =22/7 wherever required if not stated.

SECTION - A

1. The number 1.101001000100001 is :

(a) a natural number
(b) a whole number
(c) a rational number
(d) an irrational number

2. If $\frac{a}{b} + \frac{b}{a} = -1$ then value of $a^3 - b^3$ is :

(a) -1
(b) 0
(c) 1
(d) 0.5

3. In Δ ABC and Δ PQR , AB = PQ and $\angle B = \angle Q$ .The two triangles are congruent by SAS criterion if :

(a) AC = PR
(b) BC = PQ
(c) AC = QR
(d) BC = QR

4. Degree of polynomial $\sqrt{3}$ is :

(a) 1
(b) $\frac{1}{2}$
(c) 0
(d) not defined

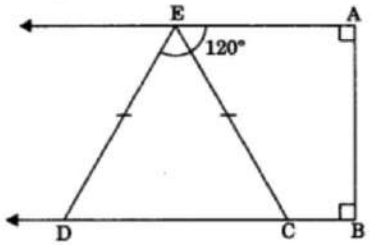
5. Degree measure of an angle which equals to one-fifth of its supplement ,the value of angle is :

(a) 30^0
(b) 75^0

(c) 15^0

(d) 150^0

6. In figure AB ⊥ AE, BC ⊥ AB, CE = DE and ∠AED = 120°, then find ∠ECD.



(a) 80°
(b) 70°
(c) 85°
(d) 60°

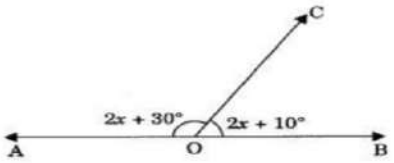
7. Equation of a line which is 5 units distance above the x-axis is :
(a) x = 5
(b) x + 5 = y
(c) x - y = 0
(d) y - 5 = 0

8. Abscissa of all the points in the x-axis is :
(a) 0
(b) 1
(c) -1
(d) any real number.

9. If the point P lies in between M & N. C is the midpoint of MP, Then
(a) MC + PN = MN
(b) MP + CP = MN
(c) MC + CN = MN
(d) CP + CN = MN

10.The perpendicular distance of the point A (m, 2n) from the x-axis is 6 units. Given that m < 0 and n > 0, In which quadrant point B with coordinates (n + 1, m) lies :
(a) I quadrant
(b) II quadrant
(c) III quadrant
(d) IV quadrant

11. In the given figure, if AOB is a straight line, then ∠BOC is



(a) 80°
(b) 70°
(c) 60°
(d) 20°

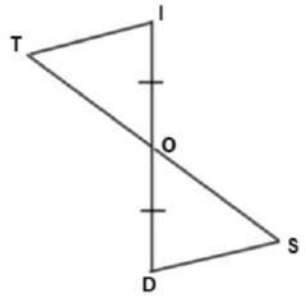
12. In Indus valley civilization (about 3000 BC) , the bricks used for construction work were having dimensions in the ratio :
(a) 1 : 3 : 4
(b) 4 : 2 : 1
(c) 4 : 4 : 1
(d) 4 : 3 : 2

13. If in Δ ABC , AB = BC = 5 cm & $\angle A = 55^0$ then $\angle B$ = _____.
(a) 55^0
(b) 110^0
(c) 70^0
(d) 125^0

14. If (s + 2, 4) = (5, t – 2), then coordinates (t , s) are :
(a) (7, 12)
(b) (6, 3)
(c) (3, 6)
(d) (2, 1)

15. In ΔABC & ΔPQR , AB = AC , $\angle C = \angle P$ and $\angle B = \angle Q$. The two triangles are :
(a) Isosceles and congruent.
(b) congruent but not isosceles.
(c) Isosceles but not congruent.
(d) Neither congruent nor isosceles.

16. Consider the triangles made by two intersecting lines as shown. Which of the following information is correct to prove that ΔTOI $\cong$ ΔSOD?



(a) $\angle$DOS = $\angle$TOI
(b) $\angle$OTI = $\angle$ODI
(c) TO = OS
(d) TI = DS

17. How many interwoven isosceles triangles compose the Sri Yantra mentioned in the Atharvaveda?
(a) 7

(b) 11
(c) 43
(d) 9

18. Two angles are supplementary. One of them is an acute angle. Which of these could be the measure of the other angle?
(a) 60°
(b) 90°
(c) 120°
(d) 180°

DIRECTIONS FOR QUESTION NUMBER 19 & 20 :
In the following questions, a statement of assertion is followed by a statement of reason . Mark the correct choice :

19. Assertion (A) : 2π is an irrational number
Reason (R) : Product of a rational and an irrational number is always an irrational number.
(a) Both Assertion and reason are correct and reason is the correct explanation for Assertion.
(b) Both Assertion and reason are correct but reason is not the correct explanation for Assertion.
(c) Assertion is true and reason is false.
(d) Assertion is false and reason is true.

20. Assertion (A) : The perimeter of a rectangle whose dimensions are represented by the expression $(x^2 + \sqrt{x})$ and $(5 - \sqrt{x})$ is a polynomial.
Reason (R) : An algebraic expression in which the powers of the variables are non-negative integers is called a POLYNOMIAL.
(a) Both Assertion and reason are correct and reason is the correct explanation for Assertion.
(b) Both Assertion and reason are correct but reason is not the correct explanation for Assertion.
(c) Assertion is true and reason is false.
(d) Assertion is false and reason is true.

SECTION - B

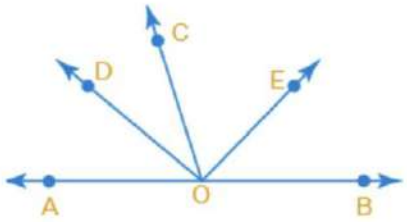
21.If $a = 7 - 4\sqrt{3}$, then find the value of $\sqrt{a} + \frac{1}{\sqrt{a}}$

Or

Evaluate :
$\sqrt{10} + \sqrt{20} + \sqrt{40} - \sqrt{5} - \sqrt{80}$
Given that $\sqrt{5} = 2.23$ and $\sqrt{10} = 3.16$

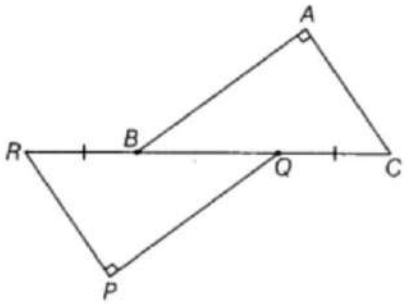
22. Plot two points A(- 1,5) and B(-2,4) on the graph. Plot the reflections of A and B along y axis and denote them by C and D respectively. Identify the figure ABDC.

23. In the figure OD is the bisector of AOC, OE is bisector of BOC and OD is perpendicular on OE. Show that points A, O and B are collinear.



OR

In the given figure BA is perpendicular to CA, RP is perpendicular to QP, AB=PQ and BR = CQ. Prove that AC = PR.



24. The sides of a triangle are 7 cm ,24 cm and 25 cm . Find the length of perpendicular from the opposite vertex to the side whose length is 25 cm .

25. Factorise : $16\sqrt{5}x^2 - 50x + 5\sqrt{5}$.

SECTION - C

26. Represent $\sqrt{7.5}$ on the number line.

OR

Express $0.\overline{6} + 0.4\overline{7}$ in the form p/q, where p and q are integers and $q \neq 0$.

27. Show that $x^3 - 8y^3 - 36xy - 216 = 0$, when $x = 2y + 6$.

28. The cost of a toy is the same as the cost of 4 balls. Express the statement as a linear equation in two variables in the form ax + by + c = 0 and write the values of a,b and c. Also find the cost of packing two toys if the cost of one ball is Rs15 and there is a fixed cost of Rs 10 for packing a toy.

29.Simplify : $\frac{(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3}{(a-b)^3+(b-c)^3+(c-a)^3}$

OR

Factorise : $2x^3 - 3x^2 - 17x + 30$

30. The perimeter of a triangle is 50 cm. One side of a triangle is 4 cm longer than the smaller side and the third side is 6 cm less than twice the smaller size. Find the area of the triangle.

31.Two parallel lines are cut by a transversal. Prove that bisectors of alternate angles are parallel to each other.

SECTION - D

32.The parking charges of a car in the hospital is Rs 25 for the first hour and Rs 10 for each hour thereafter. Taking total parking time to be x hours and total charges as y frame an equation. Draw its graph. Also find total charges when parking time is 4 hours.

33. If x = $\sqrt{2+\sqrt{5}}+\sqrt{\sqrt{5}-2}$ **and y =** $\sqrt{2+\sqrt{5}}-\sqrt{\sqrt{5}-2}$

and x^2+y^2 **= a + b**$\sqrt{5}$ **, find the values of a and b**

34. If ax^3+bx^2+x-6 **, has (x + 2) as a factor and leaves remainder 4 when divided by (x - 2). Find the values of a and b**

OR

If $x^4+\frac{1}{x^4}$ **, Find the value of** $x^3+\frac{1}{x^3}$.

35. If D is the mid point of the hypotenuse AC of a right triangle ABC,

Prove that BD = $\frac{1}{2}$ **AC.**

OR

35. (a) Prove that angles opposite to equal sides are equal.

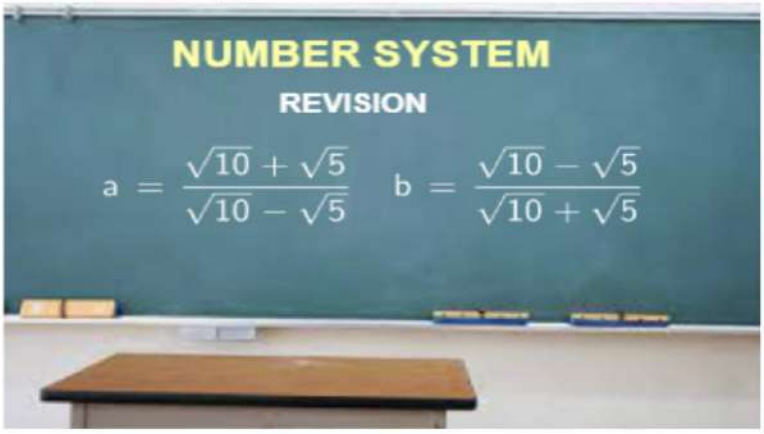
(b) Δ ABC is an isosceles triangle with AB = AC. BD and CE are medians of the Δ ABC. Prove that BD = CE.

SECTION - E

36. Two Classmates Reeta and Amar simplified two different expressions during the revision hour and explained to each other their simplification.

Reeta explains simplification of some questions when a = $\frac{\sqrt{10}+\sqrt{5}}{\sqrt{10}-\sqrt{5}}$ **& b =** $\frac{\sqrt{10}-\sqrt{5}}{\sqrt{10}+\sqrt{5}}$ **by rationalising the denominator and Amar explains simplification of** $(p-\frac{1}{p})^2$ **Where, p =** $(\sqrt{2}+1)$ **by using identity .**

Answer the following questions:



a) Simplify (p + $\frac{1}{p}$**). (1)**

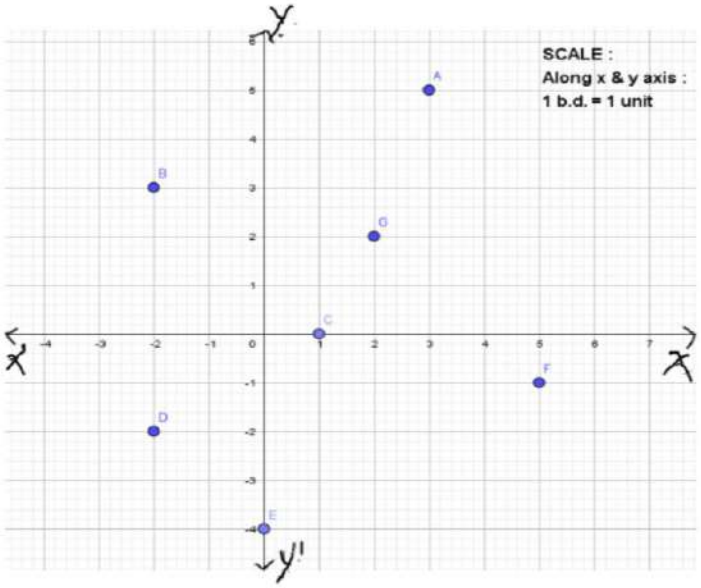
b) Find the value of $\sqrt{ab}$ **. (1)**

c) Find the value of $\sqrt{a}$ **. (2)**

OR

c) Find a rational number between (p - $\frac{1}{p}$) and (p + $\frac{1}{p}$).

37. Students of class ninth are on a visit to Sansad Bhawan. The teacher assigned them the activity to observe and take some pictures to analyse the seating arrangement between various MPs and speakers based on coordinate geometry .The staff tool guide explained various facts related to maths of Sansad Bhavan to the students. Students were surprised when the teacher asked them to apply coordinate geometry on the sitting arrangement of MPs and Speaker .Calculate the following referred to the below image and graph and answer the following questions.



(a) Find The perpendicular distance of the point A from the equation y = 0 . (1)

(b) Write the Mirror image of point B along the x - axis . (1)

(c) Find the area of the figure formed by joining the points B , D & G (2)

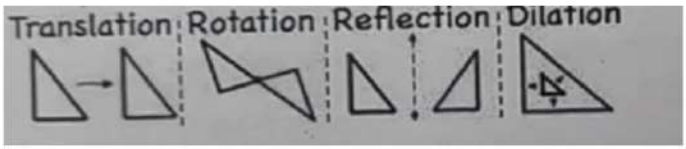
OR

Find the (abscissa of B) - (ordinate of F)

38. We say that two objects are congruent if they have the same shape and size. For instance, our reflection in a mirror has the same shape and size as we do, so we would say that we are congruent to our reflection in a mirror .

congruence transformations are transformations performed on an object that create a congruent object. There are three main types of congruence transformations:

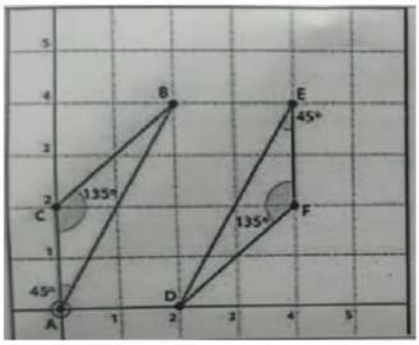
Congruence transformations are the transformations that keep the figure, same shape and size.



(a) Is dilation a congruence transformation? (1)

(b) Write the corresponding parts required to prove Δ PQR ≅ Δ LMN by SAS congruence criteria. (1)

(c) Check whether the triangles in the following figure are congruent. Justify your answer (2)



OR

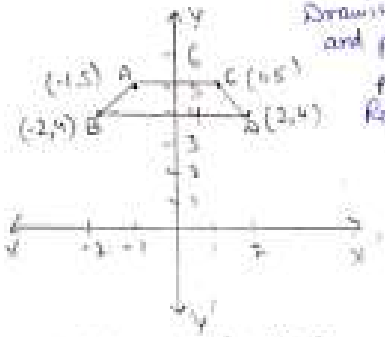
(c) Find the area of Δ ABC.

Marking Scheme of Sample Paper (2023-24)

Mathematics IX Class.

Q no	Solution	Marks allotted to each key part	Total marks
	Section A		
1.	(c) a rational number	1	1
2.	(b) 0	1	1
3.	(d) BC = QR	1	1
4	(c) 0	1	1
5	(a) 30°	1	1
6.	(d) 60°	1	1
7	(d) $y - 5 = 0$	1	1
8.	(d) any real number	1	1
9.	(c) MC + CN = MN	1	1
10	(d) IV Quadrant	1	1
11	(a) 80°	1	1
12	(b) 4 : 2 : 1	1	1
13	(c) 70°	1	1
14	(b) (6, 3)	1	1
15	(c) Isosceles but not Congruent	1	1
16	(c) TO = OS	1	1

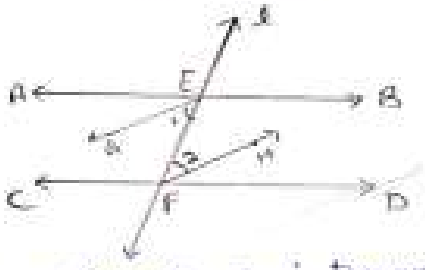
Q.no	Key points / Value points	Marks allotted to each key point	Total marks
17	(d) 9		1
18	(c) 120°		1
19	(c) Assertion is true and reason is false		1
20	(a) Both Assertion and reason are correct and reason is the correct explan		1

No	Key points / Value points	Marks allotted	Total Marks
	Section B		
21.	$a = 7-4\sqrt{3}$		
	$\frac{1}{a} = 7-4\sqrt{3}$		
	$= \frac{1}{7-4\sqrt{3}} \times \frac{7+4\sqrt{3}}{7+4\sqrt{3}} = \frac{7+4\sqrt{3}}{(7)^2-(4\sqrt{3})^2} = \frac{7+4\sqrt{3}}{49-48}$		
	$= \frac{7+4\sqrt{3}}{1}$	1	
	$\left(\sqrt{a}+\frac{1}{\sqrt{a}}\right)^2 = a + \frac{1}{a} + 2.\sqrt{a}.\frac{1}{\sqrt{a}}$		
	$= 7-4\sqrt{3}+7+4\sqrt{3}+2$		
	$= 16$		
	$\sqrt{a}+\frac{1}{\sqrt{a}} = \sqrt{16} = 4$	1	2.
	OR		
	$\sqrt{10}+\sqrt{20}+\sqrt{40}-\sqrt{5}-\sqrt{80}$		
	$= \sqrt{10}+2\sqrt{5}+2\sqrt{10}-\sqrt{5}-4\sqrt{5}$	1	
	$= 3(\sqrt{10}-\sqrt{5}) = 3(3.16-2.23)$		
	$= 3(0.93) = 2.79$	1	2.
22.	 Drawing axes and plotting points. Plotting Reflections.	1/2, 1	
	ABCD is trapezium	1/2	2.
23.	$\angle AOC = 2\angle DOC$ — (i)		
	$\angle COB = 2\angle COE$ — (ii)		
	Adding (i) & (ii)	½	
	$\angle AOC + \angle COB = 2(\angle DOC + \angle COE)$		
	$= 2\angle DOE = 2 \times 90^\circ$	1	
	$= 180^\circ$		
	AOB is straight line.		
	A, O, B are collinear	½	2.

SNo	Value Points	Marks Allotted	Total Marks
	Or		
	$BR = CQ$		
	$BR + BQ = CQ + BQ$		
	$\Rightarrow RQ = BC$ — (1)	½	
	In $\triangle BAC$ and $\triangle QPR$		
	$BC = RQ$ [From (1)]		
	$\angle BAC = \angle RPQ$ [Each 90°]		
	$AB = PQ$ [given]		
	$\therefore \triangle BAC \cong \triangle QPR$ [R.H.S]	1	
	$AC = PR$ [CPCT]	½	2.
24.	$s = \frac{7+24+25}{2} = \frac{56}{2} = 28$		
	Area $= \sqrt{28 \times (21) \times 4 \times 3}$		
	$= 84\ cm^2$	1	
	$\frac{1}{2} \times h \times 25 = 84$		
	$h = \frac{168}{25} = 6.72\ cm$	1	2.
25.	$16\sqrt{5}x^2 - 50x + 5\sqrt{5}$		
	$= 16\sqrt{5}x^2 - 40x - 10x + 5\sqrt{5}$	1	
	$= 8\sqrt{5}x(2x - \sqrt{5}) - 5(2x - \sqrt{5})$	½	
	$= (8\sqrt{5}x - 5)(2x - \sqrt{5})$	½	2.
	Section C		
26	Drawing 7.5 cm line and adding 1	½	
	Drawing perpendicular	½	
	Drawing semicircle and 90°	½ + ½	
	Plotting $\sqrt{7.5}$	1	3
	Or		

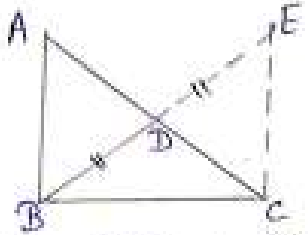
S.No	Value Points	Marks Allotted	Total Marks
26	$0.\bar{6} + 0.4\bar{7}$ Let $x = 0.\bar{6}$ $10x = 6.\bar{6}$ $9x = 6$ $x = \frac{6}{9}$	1	
	Let $y = 0.4\bar{7}$ $10y = 4.\bar{7}$ $100y = 47.\bar{7}$ $90y = 43 \Rightarrow y = \frac{43}{90}$	1	
	$x + y = 0.\bar{6} + 0.4\bar{7} = \frac{6}{9} + \frac{43}{90}$ $= \frac{103}{90}$	1	3
27)	$x = 2y + 6$ $x - 2y - 6 = 0$	1/2	
	$x^3 + (-2y)^3 + (-6)^3 = 3x(-2y)(-6)$	1/2	
	$x^3 - 8y^3 - 216 = 36xy$ —(1)	1/2	
	$x^3 - 8y^3 - 36xy - 216 = x^3 - 8y^3 - 216 - 36x$ $= 36x - 36x$ [from (1)] $= 0$	1	3
28)	Let cost of 1 toy = ₹ x cost of 1 ball = ₹ y	1/2	
	$x = 4y$ $x - 4y + 0 = 0$ $a = 1, b = -4, c = 0$	1/2 1/2	3
	Cost of 2 toys + 3 balls = $8(15) + 20 = ₹ 140$	1	
29	$\frac{(a^2-b^2)^3 + (b^2-c^2)^3 + (c^2-a^2)^3}{(a-b)^3 + (b-c)^3 + (c-a)^3}$		
	$(a^2-b^2) + (b^2-c^2) + (c^2-a^2) = 0$	1/2	
	$\therefore (a^2-b^2)^3 + (b^2-c^2)^3 + (c^2-a^2)^3 = 3(a^2-b^2)(b^2-c^2)(c^2-a^2)$	1/2	

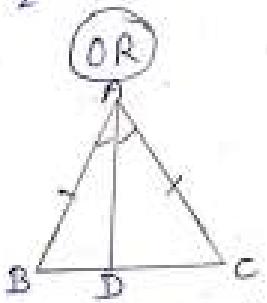
S.No	Value Points	Marks Allotted	Total No.
	$= 3(a-b)(a+b)(b-c)(b+c)(c-a)(c+a)$ —(1)		
	Similarly $(a-b)+(b-c)+(c-a)=0$	$\frac{1}{2}$	
	$\Rightarrow (a-b)^3+(b-c)^3+(c-a)^3$	$\frac{1}{2}$	
	$= 3(a-b)(b-c)(c-a)$ —(2)		
	$\therefore \frac{(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3}{(a-b)^3+(b-c)^3+(c-a)^3}$		
	$= \frac{3(a-b)(a+b)(b-c)(b+c)(c-a)(c+a)}{3(a-b)(b-c)(c-a)}$ [from 1, 2]	$\frac{1}{2}$	3
	$= (a+b)(b+c)(c+a)$	$\frac{1}{2}$	
	(Or)		
	$P(x) = 2x^3-3x^2-17x+30$	$\frac{1}{2}$	
	$P(2)=0$		
	$x-2 \;)\; 2x^3-3x^2-17x+30 \;(\; 2x^2+x-15$	1	
	$2x^3-4x^2$		
	$x^2-17x+30$		
	x^2-2x		
	$-15x+30$		
	$-15x+30$		
	0		
	$2x^3-3x^2-17x+30 = (x-2)(2x^2+x-15)$	$\frac{1}{2}$	
	$= (x-2)[2x(x+3)-5(x+3)]$	$\frac{1}{2}$	3
	$= (x-2)(x+3)(2x-5)$	$\frac{1}{2}$	

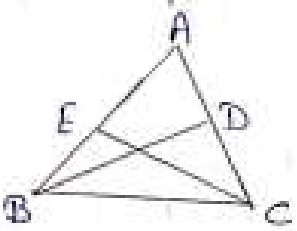
...NO	Key points / Key Value points	Marks allotted to each key point	Total marks
30	Let smaller side = x cm One side = $x+4$ Other side = $2x-6$ Perimeter = 50 cm	1/2	
	$x+x+4+2x-6 = 50$ $4x = 52$ $x = 13$ cm	1/2	
	Other two sides are $13+4=17$cm $2\times13-6 = 20$ cm	1/2	
	$s = \frac{13+17+20}{2} = \frac{50}{2} = 25$		
	Area $= \sqrt{25\times12\times8\times5}$	1/2	
	$= 5\times2\times2\sqrt{30}$ $= 20\sqrt{30}$ cm^2	1/2	3
31.		1/2	
	Given: AB ∥ CD, l is transversal $\angle AEF$ and $\angle EFD$ are alternate interior angles and GE, FH are their bisectors	1/2	
	Proof: AB ∥ CD $\angle AEF = \angle EFD$ [Alt ints]	1/2	
	$\frac{1}{2}\angle AEF = \frac{1}{2}\angle EFD \Rightarrow \angle 1 = \angle 2$	1	
	But these are alt int ∠s ∴ GE ∥ FH	1/2	3

S.No.	Key points / Value points	Marks allotted	Total Marks
32.	Let total parking time be x hrs. total charges be ₹ y		
	According to question		
	$25 + 10(x-1) = y$	½	
	$25 + 10x - 10 = y$		
	$10x - y + 15 = 0$	½	
	Table	1	
	For plotting points on Graph	2	
	Total charges when parking time is 4 hrs = ₹ 25+30 = ₹ 55	1	5
33.	$x^2+y^2 = (x+y)^2 - 2xy$	1	
	$= \left(\sqrt{2+\sqrt{3}} + \sqrt{\sqrt{3}-2} + \sqrt{2+\sqrt{3}} - \sqrt{\sqrt{3}-2}\right)^2 - 2(2+\sqrt{3}-\sqrt{3}+2)$		
	$= (2\sqrt{2+\sqrt{3}})^2 - 2(4)$	1½	
	$= 4(2+\sqrt{3}) - 8$		
	$= 8 + 4\sqrt{3} - 8$	½	
	$= 4\sqrt{3}$	½	
	$a + b\sqrt{3} = 0 + 4\sqrt{3}$	½	
	By Comparing $a = 0,\ b = 4$	1	5
34.	Let $p(x) = ax^3 + bx^2 + x - 6$ be given Polynomial		
	As $(x+2)$ is a factor of $p(x)$		
	$\therefore p(-2) = 0$ $(x+2=0 \Rightarrow x=-2)$	½	

S.No	Key points / Value points	Marks allotted	Total Marks
	$a(-2)^3 + b(-2)^2 + (-2) - 6 = 0$	1/2	
	$-8a + 4b - 2 - 6 = 0$		
	$-8a + 4b - 8 = 0$		
	$-8a + b = 2$ — (1)	1	
	It is also given that $p(x)$ leaves remainder 4 when it is divided by $(x-2)$		
	$\therefore p(2) = 4$	1/2	
	$a(2)^3 + b(2)^2 + 2 - 6 = 4$	1/2	
	$8a + 4b - 4 = 4$		
	$8a + 4b = 8$		
	$2a + b = 2$ — (2)	1	
	Add (1) & (2)		
	$5b = 4$ & $b = 2$	1/2	
	Put $b = 2$ in (2)		
	$2a + 2 = 0$		
	$2a = 0$		
	$\Rightarrow a = 0$	1/2	5
	(OR)		
	$x^4 + \frac{1}{x^4} = 47$		
	We know that		
	$\left(x^2 + \frac{1}{x^2}\right)^2 = x^4 + \frac{1}{x^4} + 2 \times x^2 \times \frac{1}{x^2}$		
	$= x^4 + \frac{1}{x^4} + 2$		
	$= 47 + 2 = 49$		
	$\left(x^2 + \frac{1}{x^2}\right)^2 = 7^2$	1½	
	$x^2 + \frac{1}{x^2} = \sqrt{49} \pm 7$		

Q.No.	Key Points / Value Points	Marks allotted	Total marks
35.	Given : $AD = CD$ $\angle ABC = 90^\circ$ To prove : $BD = \frac{1}{2} AC$		
		1	
	Construction : Produce BD to E s.o that $BD = DE$. Join EC.		
	Proof : In $\triangle ADB$ & $\triangle CDE$ $AD = DC$ (Given) $BD = DE$ (By construction) $\angle ADB = \angle CDE$ (Vertically opposite angles) By using SAS criterion of Congruence, $\triangle ADB \cong \triangle CDE$		
	$EC = AB$ — (1) & $\angle CED = \angle ABD$ (By CPCT)	1	
	Thus, transversal BE cuts AB & CE s.t. the alternate angles $\angle CED$ & $\angle ABD$ are equal. $\therefore CE \parallel AB$	1/2	
	$\Rightarrow \angle ABC + \angle ECB = 180^\circ$ (Sum of the interior angles on the same side of transversal is 180°)		

S.No	Key Points / Value Points	Marks allotted	Total marks
	$90° + \angle ECB = 180°$ $\angle ECB = 180° - 90°$ $= 90°$ Now, In $\triangle ABC$ & $\triangle ECB$ $AB = EC$ (By a)) $BC = CB$ (common) $\angle ABC = \angle ECB = 90°$ By using SAS criterion of Congruence, $\triangle ABC \cong \triangle ECB$ $\Rightarrow AC = BE$ (By CPCT) $\frac{1}{2} AC = \frac{1}{2} BE$ $\frac{1}{2} AC = BD$	1 1 1/2	5
a)	OR  Given: $\triangle ABC$ is an isosceles triangle with $AB = AC$ To prove: $\angle B = \angle C$ Construction: Draw angle bisector AD of $\angle A$ Proof: In $\triangle ABD$ & $\triangle ACD$	1/2 1/2	

Q. No	Key Points / Value points	Marks allotted	Total Marks
	$AB = AC$ (Given)		
	$\angle BAD = \angle CAD$ (By construction)		
	$AD = AD$ (common side)	1½	
	$\Rightarrow \triangle ABD \cong \triangle ACD$ (By SAS axiom)		
	$\Rightarrow \angle B = \angle C$ (By CPCT)	½	
	Hence Proved		
b)		½	
	To Prove : $BD = CE$		
	Proof: $AB = AC$ (Given)		
	$\frac{1}{2} AB = \frac{1}{2} AC$	½	
	$AD = AE$ ($\because$ BD & CE are median) ---(1)		
	In $\triangle ABD$ & $\triangle ACE$		
	$AB = AC$ (Given)		
	$\angle BAD = \angle CAE$ (Common)		
	$AD = AC$ (by 1)		
	$\triangle ABD \cong \triangle ACE$ (By SAS)	½	
	$\Rightarrow BD = CE$ (By CPCT)	½	

Q no	Value points	Key points	Marks allotted to each value point	Total marks
36 (a)	$p=(\sqrt{2}+1)$			
	$\frac{1}{p}=\frac{1}{\sqrt{2}+1}\times\frac{\sqrt{2}-1}{\sqrt{2}-1}=\frac{\sqrt{2}-1}{2-1}=\sqrt{2}-1$		½	
	$\left[p+\frac{1}{p}\right]=(\sqrt{2}+1+\sqrt{2}-1)=2\sqrt{2}$		½	1
(b)	$\sqrt{ab}=\sqrt{\frac{(\sqrt{10}+\sqrt{5})}{(\sqrt{10}-\sqrt{5})}\times\frac{(\sqrt{10}-\sqrt{5})}{(\sqrt{10}+\sqrt{5})}}$		½	
	$=\sqrt{1}=1$		½	1
(c)	$a=\frac{\sqrt{10}+\sqrt{5}}{\sqrt{10}-\sqrt{5}}\times\frac{\sqrt{10}+\sqrt{5}}{\sqrt{10}+\sqrt{5}}$		½	
	$=\frac{(\sqrt{10}+\sqrt{5})^2}{(\sqrt{10})^2-(\sqrt{5})^2}=\frac{10+5+2\sqrt{50}}{10-5}$			
	$=\frac{15+10\sqrt{2}}{5}=\frac{5(3+2\sqrt{2})}{5}$		½	
	$a=(\sqrt{1})^2+(\sqrt{2})^2+2\sqrt{1}\cdot\sqrt{2}$		½	
	$=(1+\sqrt{2})^2$			
	$\sqrt{a}=\sqrt{(1+\sqrt{2})^2}=(1+\sqrt{2})$		½	2
	OR			
	$\left(p-\frac{1}{p}\right)=(\sqrt{2}+1-\sqrt{2}+1)=2$		1	
	$\left(p+\frac{1}{p}\right)=2\sqrt{2}$			
	Rational no b/w $\left(p-\frac{1}{p}\right)$ and $\left(p+\frac{1}{p}\right)=2\sqrt{2}$		1	2

Q. No	Value points / Key points	Marks allotted to each value pt	Total marks
37	(a) 5 units	1	1
	(b) $(-2, -3)$	1	1
	(c) Base $BD = 5$	$\frac{1}{2}$	
	height 4	$\frac{1}{2}$	
	Area $= \frac{1}{2} \times$ base $\times$ height		
	$= \frac{1}{2} \times 5 \times 4^2$		
	$= 10$ unit^2	1	2
	OR.		
	= Abscissa of B − Ordinate of F		
	$= (3 - (-1)$	$1\frac{1}{2}$	
	$3 + 1$		
	$= 4$	$\frac{1}{2}$	2
38	(a) NO	1	
	(b) $PQ = LM$	$\frac{1}{2}$	
	$QR = MN$		
	(c) yes	$\frac{1}{2}$	1
	In $\triangle ACB$ and $\triangle EFD$	$\frac{1}{2}$	
	$AC = EF$		
	$\angle ACB = \angle EFD = 135^\circ$		
	$\angle CAB = \angle EED = 45^\circ$		
	$\triangle ACB \cong \triangle EFD$ by ASA	$1\frac{1}{2}$	3
	OR		
	Area $\triangle ABC = \frac{1}{2} \times b \times h = \frac{1}{2} \times 2 \times 2 = 2$ unit^2	1 + 1	2