Pati's

Solved Papers

for

ICSE

Class 10

Mathematics

How to Prepare for ICSE Class 10 exams : Free Resources

Please click on subject to proceed further.

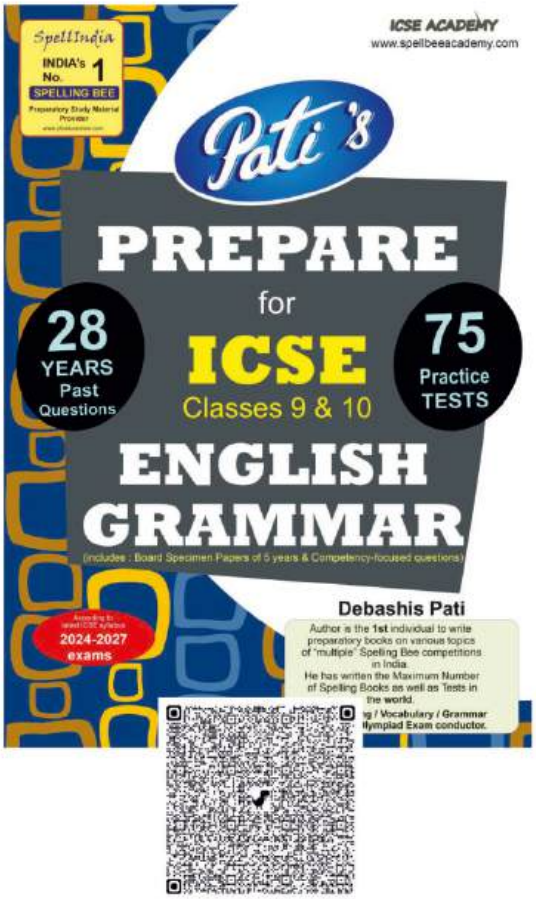
We will keep adding resources here till "March 2026".

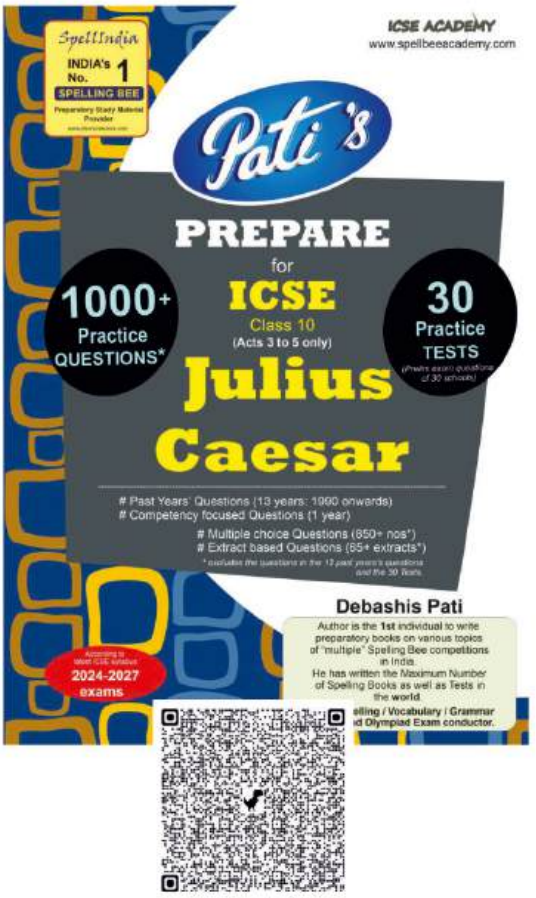
So, save this link, keep visiting and stay updated.

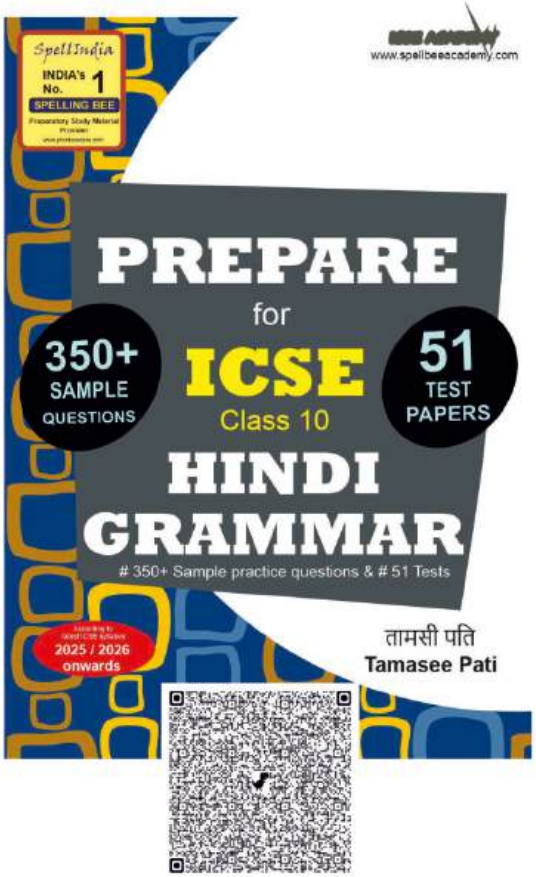
(Resources include : Syllabus, Past Year Papers, Specimen Papers, Competency based Questions, Books pdf downloadable, 350+ Term Papers / Prelim Papers of various schools - across subjects, etc.)

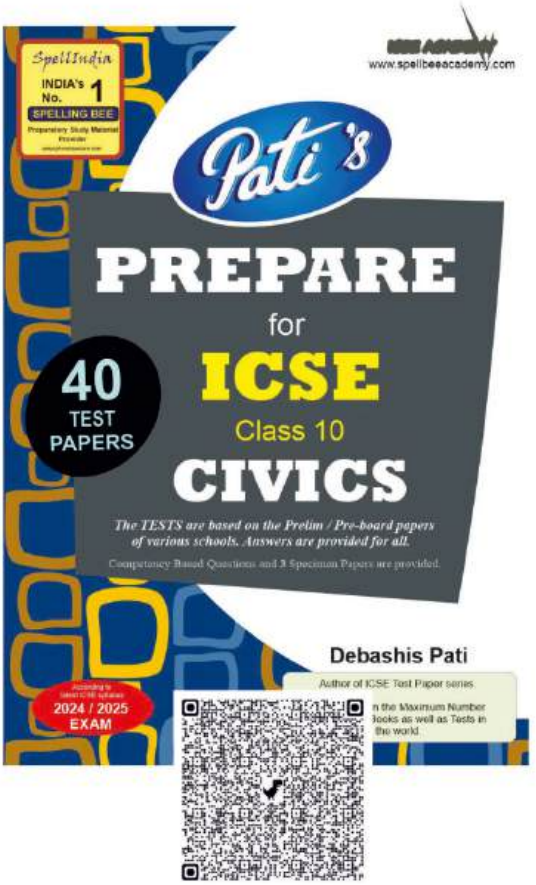
01 English Literature	02 English Language	03 Geography	04 History & Civics
05 Physics	06 Chemistry	07 Mathematics	08 Biology
09 Computer Applications	10 Physical Education	11 Hindi	12 Commercial Studies
13 Economics	14 Technical Drawing	15 Environmental Science	16 Home Science
17 Gujarati	18 Marathi	19 French	

SCAN QR code to buy the book at amazon NOW.





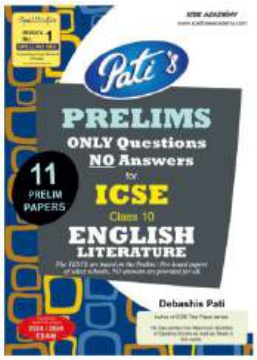


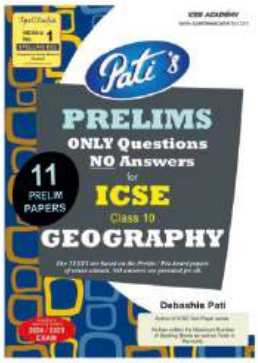


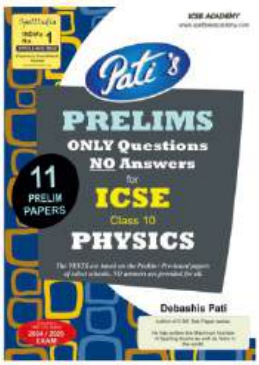
Pati's

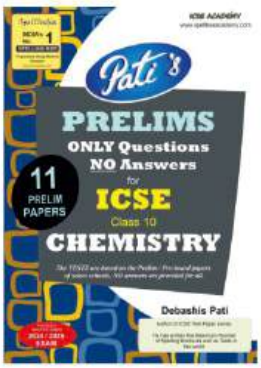
ICSE ACADEMY

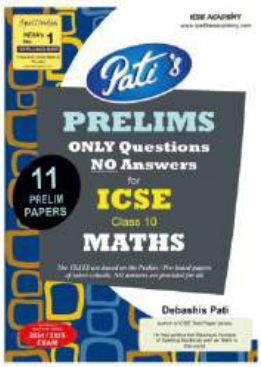
Scan QR code for Free Access to
500+ Prelim Papers across 20 subjects

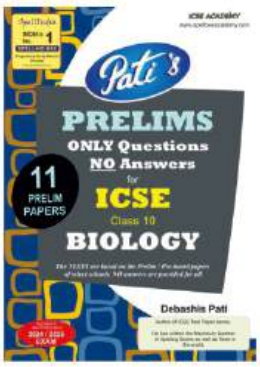


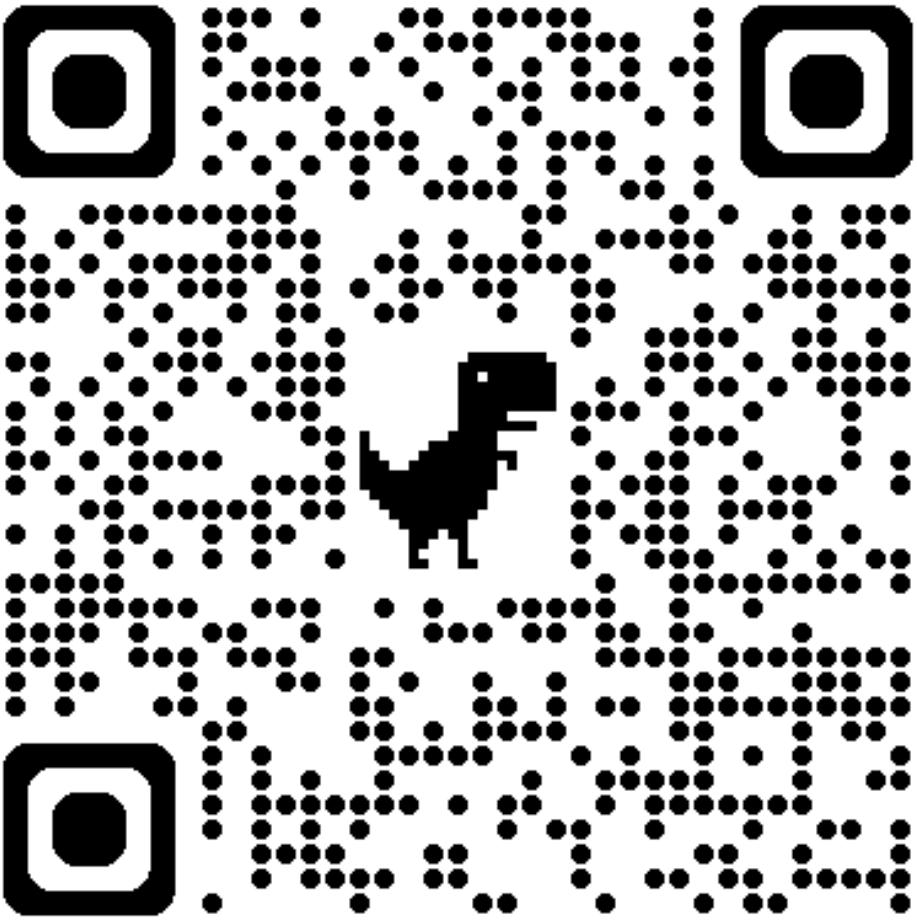










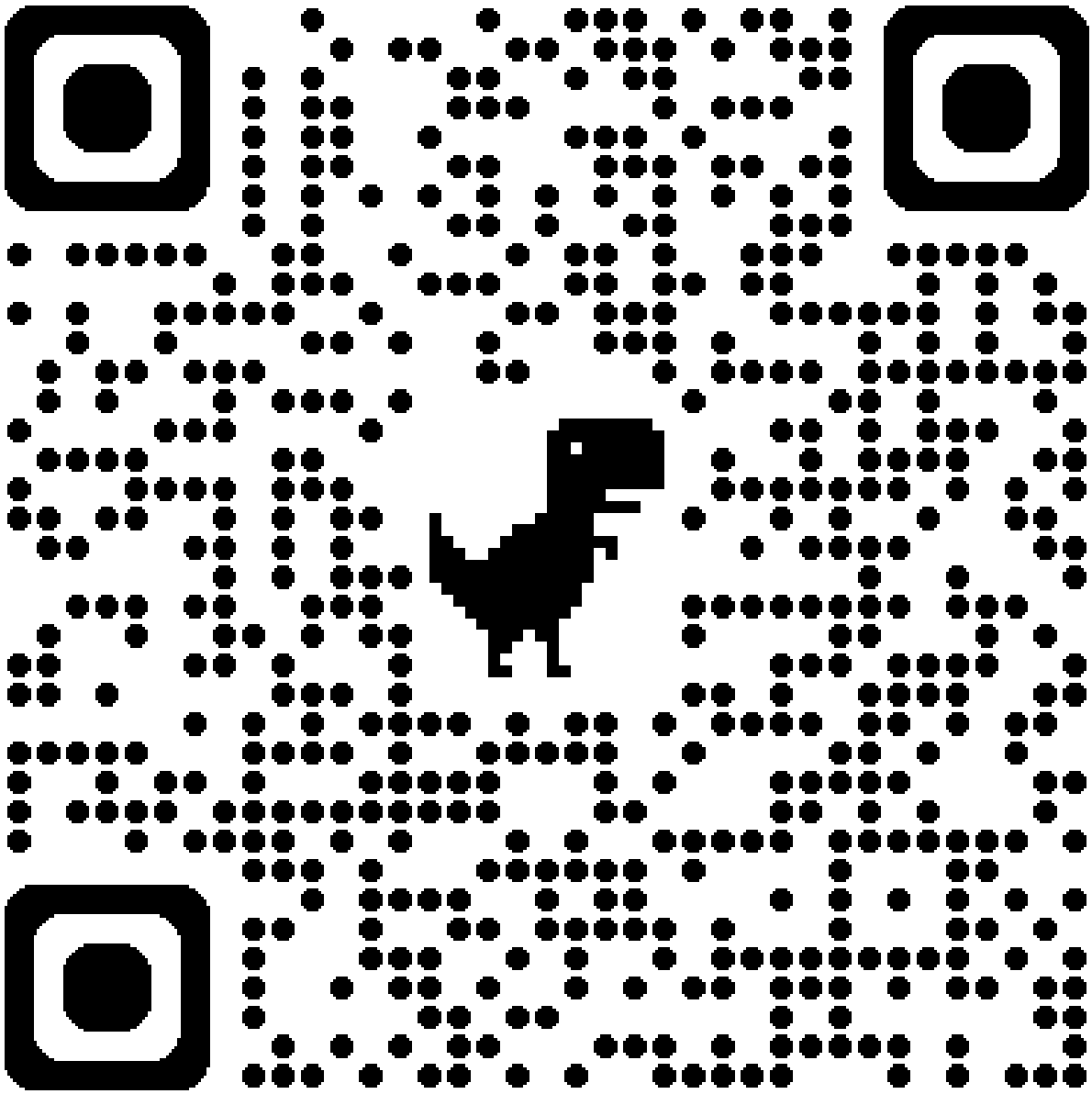


Pati's ICSE ACADEMY

Prepare for ICSE CLASS 10 Mathematics

Free Resources

SCAN QR CODE Now



Pati's

ICSE ACADEMY

1

This solved paper

is of KISA - Karnataka

ICSE Schools Association

KARNATAKA ICSE SCHOOLS ASSOCIATION

ICSE STD. X Preparatory Examination 2026

Subject – MATHEMATICS

Duration : 3 hours **Maximum Marks : 80** **Date: 12.01.2026**

General Instructions:

1. *Answers to this Paper must be written on the paper provided separately.*
2. *You will not be allowed to write during the first 15 minutes.*
3. *This time is to be spent in reading the question paper.*
4. ***The time given at the head of this Paper is the time allowed for writing the answers.***
5. *Attempt all questions from* ***Section A*** *and* ***any four*** *questions from* ***Section B.***
6. ***All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.***
7. ***Omission of essential working will result in loss of marks.***
8. *The intended marks for questions or parts of questions are given in brackets [ ].*
9. ***Mathematical tables are provided***

Instruction for the invigilators

Kindly read aloud the Instructions given above to all the candidates present in the Examination Hall.

SECTION - A (40 Marks)

*(Attempt **all** the questions from this section)*

Question 1

Choose the correct answers from the given options. [15]

(Do not copy the questions; write the correct answers with options only.)

i) The fourth vertex D of a parallelogram ABCD whose three vertices are A(-2,3),B(6,7) and C(8,3) is

(a) (0,1)

(b) (0,-1)

(c) (-1,0)

(d) (1,0)

ii) On a map 4cm represents an actual distance of 1 km.The area on the map, in cm^2, which represents 3 km^2 is

(a) 0.48

(b) 4.8

(c) 48

(d) 48000

iii) If a:b = 9:10,then then value of $\frac{2a^2-3b^2}{2a^2+3b^2}$ is

(a) $-\frac{23}{77}$

(b) $\frac{23}{77}$

(c) $\frac{24}{99}$

(d) $-\frac{77}{23}$

iv) Slope of a line is 1.5089,its inclination is

(a) 56°24'

(b) 26°28'

(c) 56°28'

(d) 26°24'

v) If d=x−13,Σfd=30,and Σf=120,then the mean is equal to

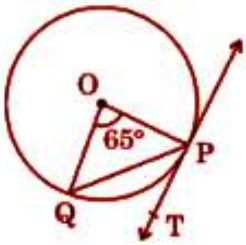
(a) 13

(b) 12.75

(c) 13.25

(d) 14.25

vi) In the given figure, PT is tangent to a circle with centre O.
Chord PQ subtends an angle of 65° at the centre.
The measure of ∠QPT is



(a) 65°

(b) 32.5°

(c) 67.5°

(d) 130°

vii) A quadratic equation whose roots are $2+\sqrt{3}$ and $2-\sqrt{3}$ is

(a) $x^2-4x+1=0$

(b) $x^2+4x+1=0$

(c) $4x^2-3=0$

(d) $x^2-1=0$

viii) **Assertion(A)**: The equation of a line through the point of intersection of the lines 2x + 5y = 9 and 5x – 2y = 8 and perpendicular to the line 4x + 3y = 7 is 3x-4y+2=0.

Reason(R) : If two lines are perpendicular to each other,the product of their slopes is equal to -1

(a) (A) is true, (R) is false.

(b) (A) is false, (R) is true.

(c) Both (A) and (R) are true and (R) is the correct explanation of (A).

(d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

ix) If $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$ then $A^2 = pA$, then the value of p is

(a) 2

(b) 4

(c) -2

(d) -4

x) The two missing terms in an AP: __,13,__,3 are

(a) 11 and 9

(b) 17 and 9

(c) 18 and 8

(d) 18 and 9

xi) If $2x - 5 \leq 5x + 4 \leq 11, x \in Z$,then the solution set is

(a) {-3,-2,-1,0,1}

(b) {-2,-1,0,1}

(c) {-3,-2,-1,0}

(d) {0,1}

xii) A metallic cone having base radius 2.1 cm and height 8.4 cm is melted and moulded into a sphere. The radius of the sphere is

(a) 2.1 cm

(b) 1.05 cm

(c) 1.5 cm

(d) 2 cm

xiii) If $P(E_1) = \frac{1}{6}$, $P(E_2) = \frac{1}{3}$, $P(E_3) = \frac{1}{6}$, where E_1, E_2, E_3 and E_4 are elementary events of a random experiment, then $P(E_4)$ is equal to

(a) $\frac{1}{2}$

(b) $\frac{2}{3}$

(c) $\frac{1}{3}$

(d) $\frac{3}{4}$

xiv) $(sec\ A\ +\ tan\ A)\ (1\ -\ sin\ A)\ =$

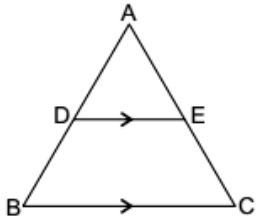
(a) $Sin\ A$

(b) $Cos\ A$

(c) $Sec\ A$

(d) $Cosec\ A$

xv) **Assertion(A)**: In the given figure, DE || BC, so that
AD = (4x – 3) cm, AE = (8x – 7) cm, BD = (3x – 1) cm
and CE = (5x – 3) cm then, the value of x is 1.



Reason(R): In triangle ABC, if DE || BC, then $\frac{AD}{DB} = \frac{AE}{EC}$

(a) (A) is true, (R) is false.

(b) (A) is false, (R) is true.

(c) Both (A) and (R) are true, and (R) is the correct explanation of (A).

(d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

Question 2

i) If A=$\begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}$, B=$\begin{bmatrix} -2 & 1 \\ -3 & 2 \end{bmatrix}$ and $A^2 - 5B^2 = 5C$,find the matrix C,
where C is a 2 by 2 matrix [4]

ii) Mrs Kour gifted the following items to her friend on Diwali. The GST rates and the quantity of each items and the marked price are given below:

Sl.No.	Items	Price (₹)	Quantity	GST Rate
1.	Almonds	650	1	5%
2.	Diyas	50	2	0
3.	Cookies	80	2	18%

Find: a) The total amount of SGST paid
b) The total amount of the bill [4]

iii) $f(x) = x^3 - ax^2 + (a - 3)x + 6$, where a is a non-zero real number. When f(x) is divided by (x + 1), there is no remainder. Using the remainder and factor theorem, factorize the above expression completely. [4]

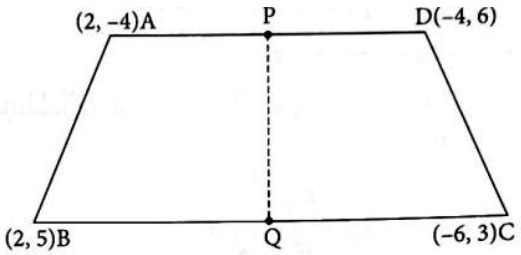
Question 3

i) Sachin has a recurring deposit account in a bank for 2 years at 6% per annum simple interest. If the gets ₹1200 as interest at the time of maturity, then find
(a) The monthly installment.
(b) The amount of maturity. [4]

ii) Two taps running together can fill a tank in $3\frac{1}{13}$ hours. If one tap takes 3 hours more than the other to fill the tank alone then how much time will each tap take to fill the tank? [4]

iii) Find the equation of the line PQ in the figure, where P and Q being the mid-points of the parallel sides AD and BC respectively where A(2,-4), B(2,5),C(-6,3),D(-4,6).

Also check whether PQ is perpendicular to BC. [5]



SECTION - B (40 Marks)

*(Attempt **any** four the questions from this section)*

Question 4

i) Two tangents PA and PB are drawn to a circle with centre O from an external point P. Prove that ∠APB = 2∠OAB [3]

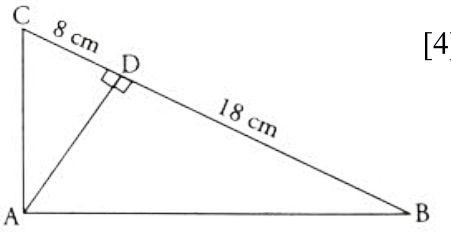
ii) Solve the quadratic equation $x^2 - 3(x + 3) = 0$,give your answer correct to two significant figures. [3]

iii) In the figure,ABC is a right angled triangle with ∠BAC=90°, [4]

Prove that (a) △ADB~△CDA

(b) If BD=18 cm,CD= 8 cm,find AD.

(c) Find the ratio of area of △ADB to area of △CDA



Question 5

i) Construct a pair of tangents to a circle of radius 4cm when the angle between the tangents is 60°. [3]

ii) If $\frac{7m+2n}{7m-2n} = \frac{5}{3}$, use the properties of proportion to find (a) $m: n$

(b) $\frac{m^2+n^2}{m^2-n^2}$ [3]

iii) Find three numbers in GP such that their product is 729 and the sum of the first and the third is 30. [4]

Question 6

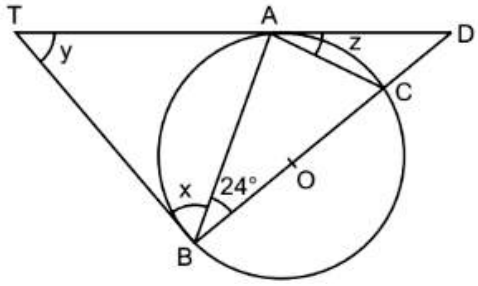
i) Rishab invests ₹4,500 in 8%, ₹10 shares at ₹15. He sells the shares when the price rises to ₹30, and invests the proceeds in 12% ₹100 shares at ₹125. Calculate:

(a) the sale proceeds.

(b) the number of ₹125 shares he buys.

(c) the change in his annual income from dividend [3]

ii) The tangents TA and TB are drawn to the circle with centre O. The diameter BC and tangent TA, when produced, meet at D. Given that ∠ABC = 24°, calculate the values of x, y and z. [3]



iii) The sum of the first n terms of an AP is given by $S_n = (3n^2 - n)$.Find its

(a) first term and (b) common difference (c) n^{th} term (d) 20^{th} term [4]

Question 7

(i) Use graph sheet for this question.Take 2 cm = 1 unit along the axes.

Plot the △OAB, where 0 (0,0), A (3,-2), B (2,-3).

(a) Reflect the △OAB through the origin and name it as △OA'B'

(b)Reflect the △OA'B' on Y- axis and name it as △OA"B"

(c)Reflect the △OA'B' on X- axis and name it as △OA'"B'"

(d) Join the points AA"B"B'A'A'"B'"B and give the geometrical name of the closed figure so formed. [5]

(ii)The following distribution represents heights of 160 students of a school

Height (in cm)	140-145	145-150	150-155	155-160	160-165	165-170	170-175	175-180
No . of students	12	20	30	38	24	16	12	8

Draw an ogive for the given distribution taking 2 cm = 5 cm of height on one axis and 2 cm = 20 students on the other axis. Using the graph, determine: [5]

(a) The median height.

(b) The interquartile range.

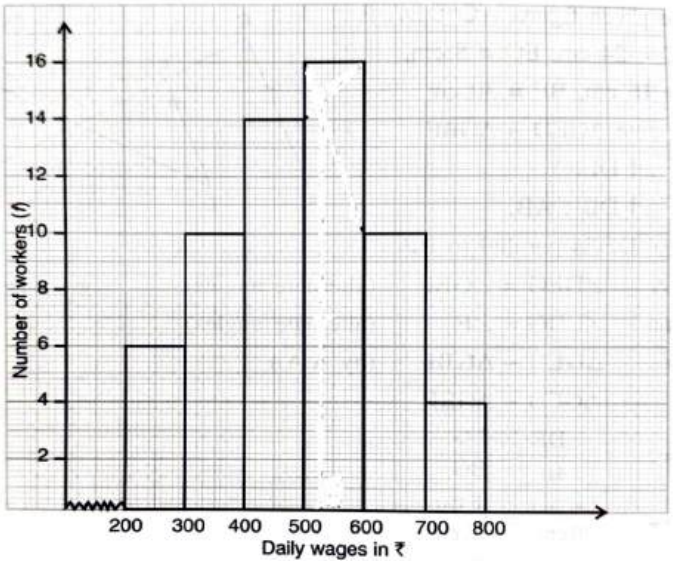
(c) The number of students whose height is above 172 cm. [5]

Question 8

i) Prove that $\frac{cosec\,\theta}{cosec\,\theta-1} + \frac{cosec\,\theta}{cosec\,\theta+1} = 2\,sec^2\,\theta$ [3]

ii) Find k so that the point P (-4, 6) lies on the line segment joining A (k, 10) and B (3, -8). Also, find the ratio in which P divides AB [3]

iii) For the given histogram,construct the frequency distribution table and hence find the mean by step deviation method. [4]



Question 9

i) Solve the given inequation and graph the solution set on numberline: [3]

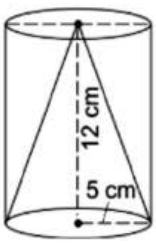
$$-3 + x \leq \frac{8x}{3} + 2 < \frac{14}{3} + 2x, x \in R$$

ii) Using ruler and compasses only,construct $\angle ABC=120°$,where AB=BC=7cm.

(a) Mark two points D and E which satisfy the condition that they are equidistant from both BA and BC and D is equidistant from B and C as well.

(b) In the above figure join DA and DC and name the figure ABCD. [3]

iii) From a solid right circular cylinder with height 12 cm and radius of the base 5 cm, a right circular cone of the same height and the same base radius is removed. Find the volume and total surface area of the remaining solid. [Use π = 3.14] [4]



Question 10

i) Cards numbered from 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that the number on the drawn card is

(a)Divisible by 4 or 6

(b) Multiple of 2 and 5

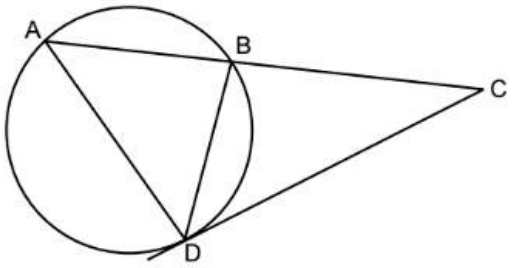
(c) Factors of 60 [3]

ii)Two people standing on the same side of a tower in a straight line with it, measure the angles of elevation of the top of the tower at 25° and 50° respectively. If the height of the tower is 70m, find the distance between the two people. [3]

iii) In the given figure, AB = 7 cm and BC = 9 cm.

(a) Prove △ACD ~ △DCB.

(b) Find the length of CD. [4]



**** ALL THE BEST ****

KISA PREPARATORY EXAMINATION
2025-2026
SUB: MATHEMATICS
ANSWER KEY

Question 1

i) b) $(0,-1)$

ii) c) 48

iii) a) $-\frac{23}{77}$

iv) c) $56^\circ 28'$

v) c) $13.25'$

vi) b) 32.5°

vii) a) $x^2-4x+1=0$

viii) b) Assertion (A) is false but reason (R) is true

ix) b) 4

x) c) 18 and 8

xi) a) $\{-3,-2,-1,0,1\}$

xii) a) 2.1 cm

xiii) c) $\frac{1}{3}$

xiv) b) cos A

xv) c) Both (A) and (R) are true and (R) is the correct explanation of (A).

Question 2

(i) $A = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 1 \\ -3 & 2 \end{bmatrix}$

$A^2 = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}\begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 10 & 15 \\ 15 & 25 \end{bmatrix}$ (1)

$B^2 = \begin{bmatrix} -2 & 1 \\ -3 & 2 \end{bmatrix}\begin{bmatrix} -2 & 1 \\ -3 & 2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (1)

Now, $A^2 - 5B^2 = 5C$ → (1)

$\begin{bmatrix} 10 & 15 \\ 15 & 25 \end{bmatrix} - \begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix} = 5C$

$\frac{1}{5}\begin{bmatrix} 5 & 15 \\ 15 & 20 \end{bmatrix} = C$

$\therefore C = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}$ (1)

(ii)

Sl.No	Items	Price (₹)	Quantity	Total sale price	SGST(₹)	CGST(₹)	Bill
1	Almonds	650	1	650	16.25	16.25	682.50 (1)
2	Diyas	50	2	100	-	-	100
3	Cookies	80	2	160	14.40	14.40	188.80 (1)

a) The total amount of SGST paid = ₹ 30.65 (1)

b) The total amount of bill = ₹ 971.30 (1)

iii) $f(x) = x^3 - ax^2 + (a-3)x + 6$

Factor: $x+1$

$x+1 = 0$

$x = -1$

As $(x+1)$ is one of the factor of $f(x)$

By factor theorem

$f(-1) = 0$

$(-1)^3 - a(-1)^2 + (a-3)(-1) + 6 = 0$ (1)

$-1 - a - a + 3 + 6 = 0$

$2a = 8$

$a = 4$ (1)

$\therefore f(x) = x^3 - 4x^2 + x + 6$

$x^2 - 5x + 6$ (1)

$x+1 \overline{)\, x^3 - 4x^2 + x + 6}$

$x^3 \pm x^2$

$-5x^2 + x$

$-5x^2 \pm 5x$

$+6x + 6$

$6x \pm 6$

$0\ 0$

$\therefore f(x) = (x+1)(x^2 - 5x + 6)$

$= (x+1)(x^2 - 3x - 2x + 6)$

$= (x+1)(x(x-3) - 2(x-3))$

$f(x) = (x+1)(x-3)(x-2)$ (1) [factors without commas]

Question 3

i) $n = 24$, $r = 6\%$ p.a., $I = ₹1200$

(a) $I = \frac{P \times n \times (n+1)}{2 \times 12} \times \frac{r}{100}$

$1200 = \frac{P \times 24 \times 25}{2 \times 12} \times \frac{6}{100}$ (1)

$\therefore P = \frac{1200 \times 2}{3}$

$\therefore P = ₹800$ (1)

(b) $MV = Pn + I$

$= 800 \times 24 + 1200$ (1)

$= 19200 + 1200$

$= ₹20,400$ (1)

(ii) Let the time taken by one tap = x hour alone

$\therefore$ time taken by another tap = $(x+3)$ hours

Part of tank filled by first tap in 1 hr = $\frac{1}{x}$

part of tank filled by other tap = $\frac{1}{x+3}$

Now, $\frac{1}{x} + \frac{1}{x+3} = \frac{1}{\frac{40}{13}}$ (1)

$\frac{1}{x} + \frac{1}{x+3} = \frac{13}{40}$

$\frac{2x+3}{x^2+3x} = \frac{13}{40}$

$13x^2 - 41x + 120 = 0$ (1)

$13x^2 - 65x + 24x - 120 = 0$ (1)

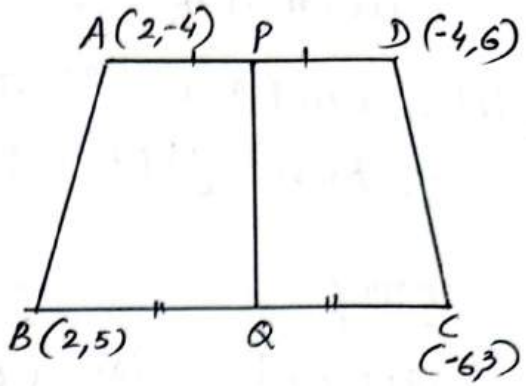
$(x-5)(13x+24) = 0$

$x - 5 = 0$ or $13x + 24 = 0$

$x = 5$ $\quad x = -\frac{24}{13}$ Not possible as time cannot be -ve

$\therefore$ Time taken by one pipe to fill the tank alone = 5 hour, another pipe = 8 hours (1)

(iii) Since P is midpoint of AD



By midpoint formula

$P(x,y) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$= \left(\frac{2-4}{2}, \frac{-4+6}{2}\right)$

$P = (-1, 1)$

Since Q is midpoint of BC

$Q(x,y) = \left(\frac{2-6}{2}, \frac{5+3}{2}\right)$

$Q = (-2, 4)$ or (1)

Slope of $PQ = \frac{y_2-y_1}{x_2-x_1} = \frac{4-1}{-2+1} = \frac{3}{-1} = -3$ (1)

By two point form,

Equation of PQ $= y-y_1 = m(x-x_1)$

$y-4 = -3(x+2)$

$y-4 = -3x-6$

$3x+y+2 = 0$ (1)

Next

Slope of $BC = \frac{3-5}{-6-2} = \frac{-2}{-8} = \frac{1}{4}$ (1)

Slope of PQ × Slope of $BC = -3 \times \frac{1}{4} = -\frac{3}{4}$ } (1)

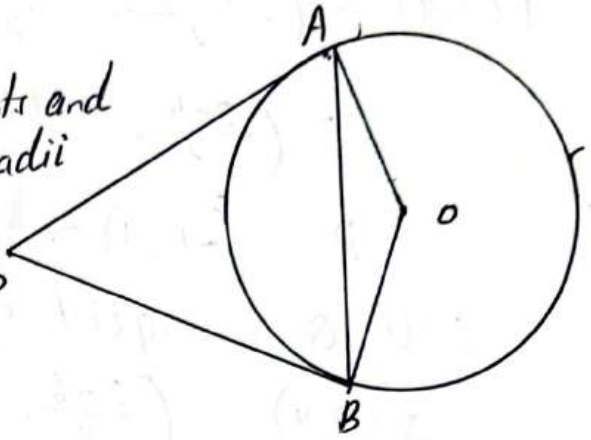
Since Slope of PQ × Slope of BC $\neq -1$

$\Rightarrow$ PQ is not perpendicular to BC

Question 4.

(i) Given: PA and PB are tangents from external point P

To prove: $\angle APB = 2\angle OAB$



Proof:

$\angle APB + \angle AOB = 180°$ (Angle b/w tangents and angle formed by radii drawn at the point of contact P at centre are supplementary)

$\angle APB = 180° - \angle AOB$ — (1)

Next,

In $\triangle AOB$, $AO = BO$ (radii)

$\therefore \angle OAB = \angle OBA$ (angles opp to equal angles)

Now, $\angle AOB + \angle OAB + \angle OBA = 180$ (Angle Sum property of $\triangle$)

$\angle AOB + 2\angle OAB = 180°$

$\angle AOB = 180 - 2\angle OAB$ — (2) (1) for eq (1) or eq (2)

Subst $\angle AOB$ in eq (1)

$\angle APB = 180° - (180° - 2\angle OAB)$ (1)

$\angle APB = 2\angle OAB$

$\therefore \angle APB = 2\angle OAB$ (1)

Hence proved.

ii) $x^2 - 3(x+3) = 0$

$x^2 - 3x - 9 = 0$

$a = 1,\ b = -3,\ c = -9$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{3 \pm \sqrt{(-3)^2 - 4(1)(-9)}}{2(1)}$$

(1) (correct formula and correct substitution)

$= \frac{3 \pm \sqrt{45}}{2}$

$= \frac{3 \pm 6.708}{2}$ → (1)

$x = \frac{3+6.708}{2}$; $x = \frac{3-6.708}{2}$

$x = \frac{9.708}{2}$ $\quad x = -\frac{3.708}{2}$

$x = 4.854$ $\quad x = -1.854$

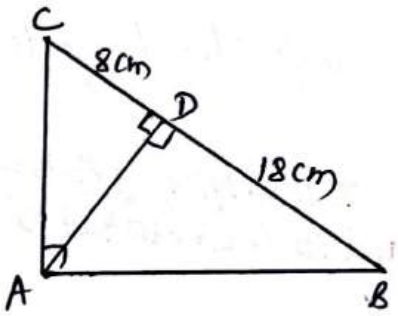
$x = 4.9$ $\quad x = -1.9$ } (1) (All 4 correct)

(iii) Let $\angle DAB = x$, $\angle DAC = 90 - x$

$\angle ABD = 90 - x$ and $\angle ACD = x$

$\Rightarrow \angle DAC = \angle DBA$ —(1)

$\angle DCA = \angle DAB$ —(2) } (1)



(a) $\Delta ADB \quad \Delta CDA$

$\angle DBA = \angle DAC$ (from 1)

$\angle DAB = \angle DCA$ (from 2)

$\therefore \Delta ADB \sim \Delta CDA$ (AA criteria) (1)

$\frac{AD}{CD} = \frac{DB}{DA} = \frac{AB}{CA}$ (Corresponding sides of similar Δles are proportional)

(b) Consider $\frac{AD}{CD} = \frac{DB}{DA}$

$AD^2 = CD \times DB$

$= 8 \times 18$

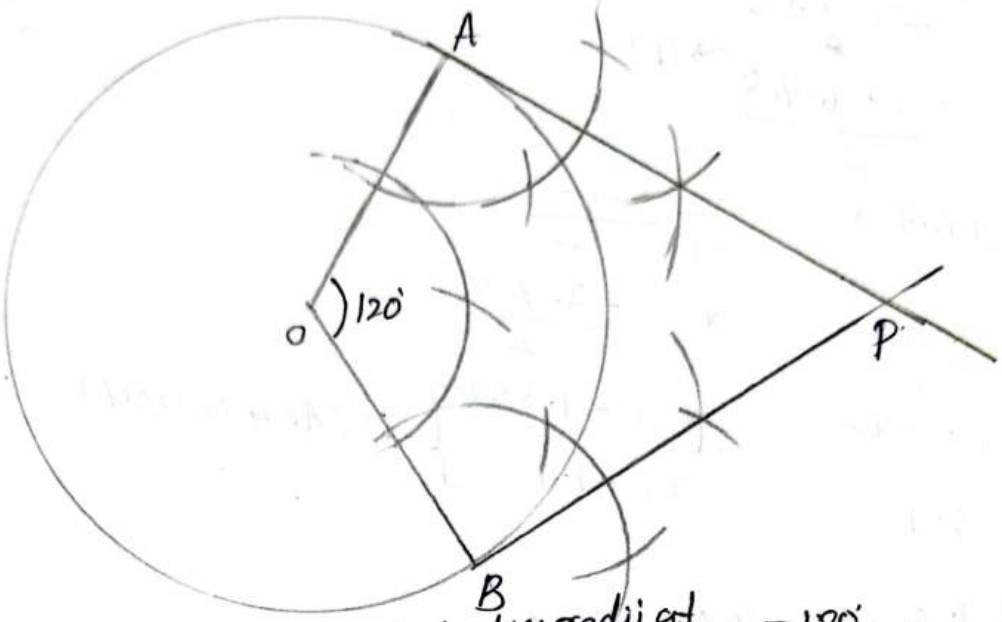
$AD = 12\text{cm}$ (1)

(c) $\frac{\text{Ar. } \Delta ADB}{\text{Ar. } \Delta CDA} = \frac{AD^2}{CD^2} = \frac{12^2}{8^2} = \frac{9}{4}$

$\therefore$ Ar. ΔADB : Ar. $\Delta CDA = 9 : 4$ (1)

Question 5

(i)



The angle b/w tangents + Angle Sustended by radii at the point of Contact at Centre $= 180°$

Identifying $\angle AOB = 120°$ (1), Drawing $\perp$ at A & B (1)
and its Construction at O
Length of tangent = 6.6 cm (± 0.2) (1)

(ii) $\frac{7m+2n}{7m-2n} = \frac{5}{3}$

(a) Applying Componendo and dividendo

$\frac{7m+2n+7m-2n}{7m-2n-7m+2n} = \frac{5+3}{5-3}$ (1) (Applying correct property)

$\frac{14m}{4n} = \frac{4}{1}$

$m:n = 8:7$ (1)

(b) $\frac{m}{n} = \frac{8}{7}$

Squaring on both side

$\frac{m^2}{n^2} = \frac{64}{49}$

Applying Componendo and dividendo

$\frac{m^2+n^2}{m^2-n^2} = \frac{113}{15}$ (1)

(iii) Let the three numbers in GP be $\frac{a}{r}, a, ar$

$$\frac{a}{r} \times a \times ar = 729$$

$$a^3 = 729$$

$$a = 9 \quad (1)$$

Next, $\frac{a}{r} + ar = 30$

$$\frac{9}{r} + 9r = 30$$

$$9r^2 - 30r + 9 = 0$$

$$3r^2 - 10r + 3 = 0 \quad (1)$$

$$3r^2 - 9r - r + 3 = 0$$

$$3r(r-3) - 1(r-3) = 0$$

$$(r-3)(3r-1) = 0$$

$$r = 3, \; r = \frac{1}{3} \quad (1)$$

If $a = 9, r = 3$

Req. no are: $\frac{a}{r}, a, ar$

$\frac{9}{3}, 9, 9(3)$

3, 9, 27

If $a = 9, r = \frac{1}{3}$

Req. no are: $\frac{a}{r}, a, ar$

$\frac{9}{1/3}, 9, 9(\frac{1}{3})$

27, 9, 3

(1) or

Question 6

(i) For first investment:

Face value of each share = ₹10

Market value of each share = ₹15

Investment = ₹4500

∴ No. of shares purchased $= \frac{4500}{15} = 300$

(a) Sale proceeds = ₹30 × 300 = ₹9000 (1)

(b) No. of ₹125 shares purchased $= \frac{9000}{125} = 72$ (1)

(c) Total face value = ₹100 × 72 = ₹7200

Dividend = $\frac{12}{100}$ × 7200 = ₹864

Total face value of first investment = ₹300 × 10 = ₹3000

Dividend = ₹ 8·1· × 3000

= $\frac{8}{100}$ × 3000

= ₹240

∴ change in his annual income from dividend

= ₹864 − ₹240

= ₹624 (1)

(ii) ∠CAD = ∠ABC (The angle between a tangent and a chord through the point of contact is equal to an angle in the alternate segment)

$z = 24^\circ$ (1)

next

∠OBT = 90

$24 + x^\circ = 90^\circ$

$x = 66^\circ$ (1) (Radii drawn at the point of contact ⊥ to tangent)

next TA = TB (Tangents drawn from external point to circle are equal in length)

∠TAB = ∠TBA (Base angles.

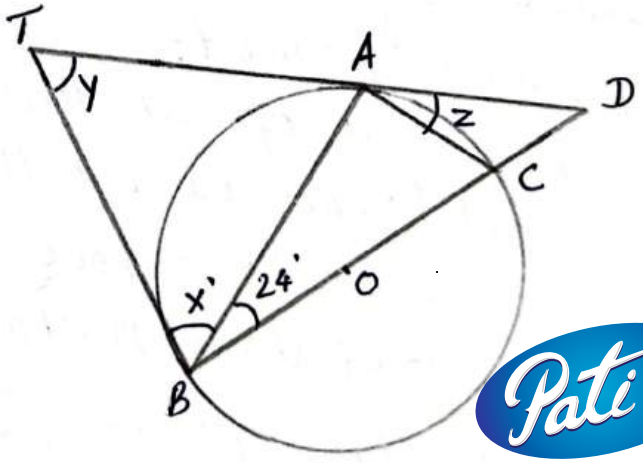
∠TAB = ∠TBA = $x = 66^\circ$

In Δ TAB,

∠ATB + ∠TAB + ∠TBA = 180° (Asp)

$y^\circ + 66^\circ + 66^\circ = 180^\circ$

∴ $y = 48^\circ$ (1)



(iii)(a) $S_n = 3n^2 - n$

$S_1 = 3(1)^2 - 1$

$S_1 = 2$

$\therefore a = 2$ (1)

(b) $S_2 = 3(2)^2 - 2$

$S_2 = 10$

$\therefore a_2 = S_2 - S_1$

$= 10 - 2$

$a_2 = 8$

$\therefore d = a_2 - a_1$

$= 8 - 2$

$d = 6$ (1)

(c) $a_n = a + (n-1)d$

$= 2 + (n-1)6$

$= 2 + 6n - 6$

$a_n = 6n - 4$ (1)

$a_n = 2(3n - 2)$

(d) $a_{20} = 6(20) - 4$

$a_{20} = 116$ (1)

Question 7

(i) (a) $M_o A(3, -2) = A'(-3, 2)$, $M_o B(2, -3) = B'(-2, 3)$ (1)

(b) $M_y A'(-3, 2) = A''(3, 2)$, $M_y B'(-2, 3) = B''(2, 3)$ (1)

(c) $M_x A(-3, 2) = A'''(-3, -2)$, $M_x B'(-2, 3) = B'''(-2, -3)$ (1)

} To be plotted correctly

Correct scale and all 4 triangles to be plotted (1)

Geometrical name of closed figure: octagon or Eight sided polygon (1)

(ii)

Height (in cm)	140-145	145-150	150-155	155-160	160-165	165-170	170-175	175-180
No. of Students	12	20	30	38	24	16	12	8
Cf	12	32	62	100	124	140	152	160

First 6 correct Cf (1)

(a) Median $= \left(\frac{N}{2}\right)^{th}$ score $= \left(\frac{160}{2}\right)^{th}$ score $= 157.5 \pm 0.2$ cm (1)

(b) Lower quartile $(Q_1) = \left(\frac{N}{4}\right)^{th}$ score $= \left(\frac{160}{4}\right)^{th}$ score $= 40^{th}$ score $= 151.3 \pm 0.2$ cm

Upper quartile $(Q_3) = \left(\frac{3N}{4}\right)^{th}$ score $= \left(\frac{3 \times 160}{4}\right)^{th}$ score $= 120^{th}$ score $= 164.2 \pm 0.2$ cm

Inter quartile range $= Q_3 - Q_1$

$= 164.2 - 151.3$

$= 12.9$ cm (1)

(c) No. of students whose height is above 172 cm $= 160 - 144$

$= 16$ (± 2) (1)

Correct Scale, Smooth Curve, Kink (1)

Question 8

i) LHS: $\frac{\text{cosec}\theta}{\text{cosec}\theta - 1} + \frac{\text{cosec}\theta}{\text{cosec}\theta + 1}$

$$\frac{\text{cosec}\theta(\text{cosec}\theta + 1) + \text{cosec}\theta(\text{cosec}\theta - 1)}{\text{cosec}^2\theta - 1}$$

$$\frac{\text{cosec}^2\theta + \text{cosec}\theta + \text{cosec}^2\theta - \text{cosec}\theta}{\text{cosec}^2\theta - 1} \quad (1)$$

$$\frac{2\,\text{cosec}^2\theta}{\text{cosec}^2\theta - 1}$$

$$= \frac{2\,\text{cosec}^2\theta}{\cot^2\theta} \quad (1) \qquad [\because \text{cosec}^2\theta - \cot^2\theta = 1]$$

$$= 2 \times \frac{1}{\sin^2\theta} \div \frac{\cos^2\theta}{\sin^2\theta}$$

$$= 2 \times \frac{1}{\sin^2\theta} \times \frac{\sin^2\theta}{\cos^2\theta}$$

$$= 2 \times \frac{1}{\cos^2\theta}$$

$$= 2\sec^2\theta \quad (1)$$

$$= \text{RHS}$$

(If reason is not mentioned ow -1)

(ii) If P(-4, 6) lies on the line segment joining A(K, 10) and B(3, -8), then

A(K, 10) P(-4, 6) B(3, -8)

P, A and B are collinear.

$\therefore$ Slope of AP = Slope of PB

$$\frac{6-10}{-4-K} = \frac{-8-6}{3+4} \quad (1)$$

$$\frac{-4}{-4-K} = \frac{-14}{7}$$

$$\therefore \boxed{K = -6} \quad (1)$$

Let the ratio in which P(-4, 6) divides AB be $m_1 : m_2$

∴ By Section formula,

$$P(x, y) = \left(\frac{m_1x_2 + m_2x_1}{m_1+m_2}, \frac{m_1y_2 + m_2y_1}{m_1+m_2}\right)$$

$$(-4, 6) = \left(\frac{3m_1 - 6m_2}{m_1+m_2}, \frac{-8m_1 + 10m_2}{m_1+m_2}\right)$$

$$-4 = \frac{3m_1 - 6m_2}{m_1+m_2}$$

$$-4m_1 - 4m_2 = 3m_1 - 6m_2$$

$$\frac{m_1}{m_2} = \frac{2}{7}$$

∴ Required ratio $m_1 : m_2 = 2 : 7$ (1) [Should be in ratio form only.]

iii)

C I	f	x	d = X - A	t = d/i	ft	
200-300	6	250	-300	-3	-18	Let A = 550
300-400	10	350	-200	-2	-20	-52
400-500	14	450	-100	-1	-14	
500-600	16	550	0	0	0	Any 4 Correct 'x' = (1)
600-700	10	650	100	1	10	Any 4 Correct 'ft' = (1)
700-800	4	750	200	2	8	18
	Σf = 60				Σft = -34	

$$\text{Mean } (\bar{x}) = A + \frac{\Sigma ft}{\Sigma f} \times i$$

$$= 550 + \left(\frac{-34}{60}\right) \times 100 \quad (1)$$

$$= 550 - \frac{170}{3}$$

$$= \frac{1650 - 170}{3}$$

$$\bar{x} = 493.33 \quad (1)$$

Question 9

(i) $-3 + x \leq \frac{8x}{3} + 2 < \frac{14}{3} + 2x, \quad x \in R$

$-3 + x \leq \frac{8x}{3} + 2$ and $\frac{8x}{3} + 2 < \frac{14}{3} + 2x$

$-5 \leq \frac{5x}{3}$ $\qquad$ $\frac{2x}{3} < \frac{8}{3}$

$-3 \leq x$ $\qquad$ $x < 4$

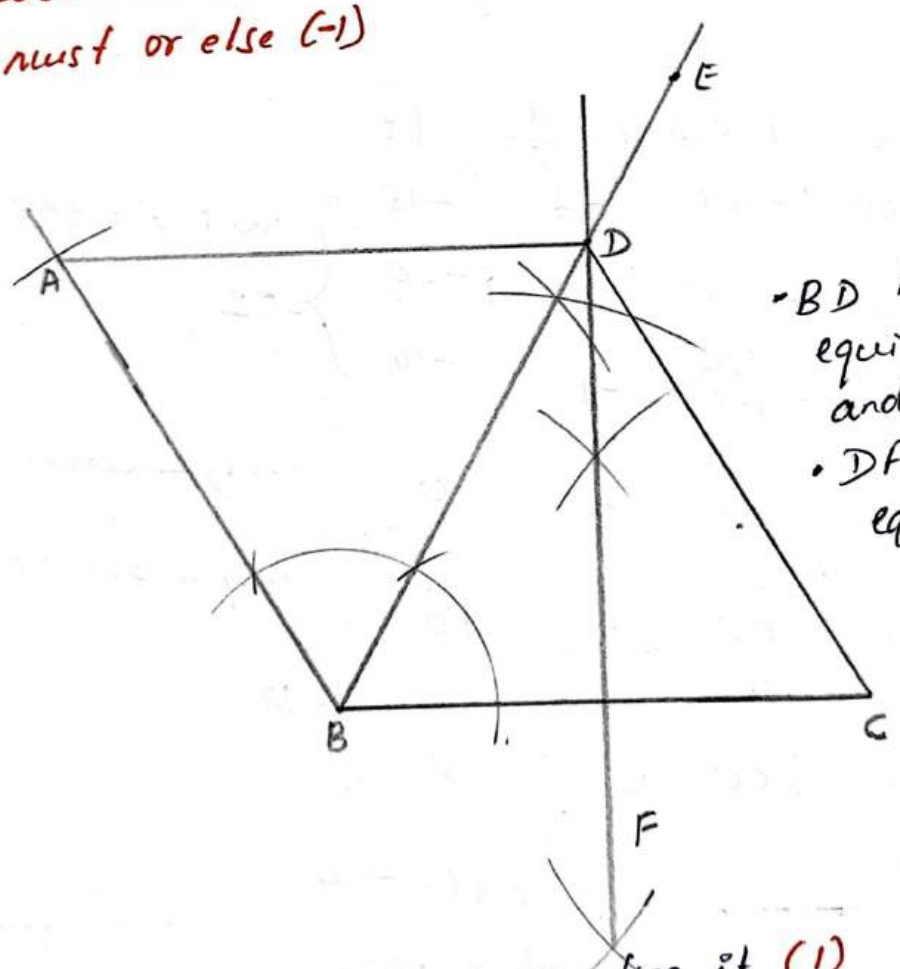
$-3 \leq x < 4$ (1)

Sol. set : $\{x : x \in R, -3 \leq x < 4\}$ (1)

(1)

Atleast two extra no. on both side and arrowhead on no.line is must or else (-1)

ii)



- BD is locus of a point equidistant from AB and BC
- DF is locus of a point equidistant from B and C.

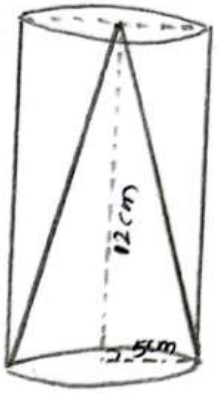
Construction of 120° and bisecting it (1)

Constructing perpendicular bisector of BC and locating point D (1)

ABCD is rhombus (1)

(iii) Radius of cylinder and cone, $r = 5\text{cm}$

Height of each of cylinder and cone, $h = 12\text{ cm}$



Slant height of cone $l = \sqrt{r^2+h^2}$

$= \sqrt{5^2+12^2}$

$l = 13$ (1)

Volume of remaining solid = Volume of cylinder − Volume of cone

$= \pi r^2 h - \frac{1}{3}\pi r^2 h$

$= \frac{2}{3}\pi r^2 h$ → or Correct formula & Substitution (1)

$= \frac{2}{3} \times 3.14 \times 5 \times 5 \times 12$

$= 628\text{ cm}^3$ (1)

Total Surface area of remaining solid

= CSA of cylinder + CSA of cone + area of upper circular face of cylinder.

$= 2\pi rh + \pi rl + \pi r^2$

$= \pi r(2h + l + r)$

$= 3.14 \times 5 (2 \times 12 + 13 + 5)$

$= 3.14 \times 5 \times 42$

$= 659.4\text{ cm}^2$ (1)

Question 10

i) $S = \{11, 12, 13, \ldots\ldots 58, 59, 60\}$

$n(S) = 50$

(a) A no. divisible by 4 or 6 $= (E_1) = \{12, 16, 18, 20, 24, 28, 30, 32, 36, 40, 42, 44, 48, 52, 54, 56, 60\}$

$n(E_1) = 17$

$$P(E_1) = \frac{\text{No. of favourable outcomes}}{\text{Total no. of all possible outcomes}}$$

$$= \frac{n(E_1)}{n(S)}$$

$$P(E_1) = \frac{17}{50} \quad (1)$$

(b) A multiple of 2 and 5 $(E_2) = \{20, 30, 40, 50, 60\}$

$n(E_2) = 5$

$$P(E_2) = \frac{\text{No. of favourable outcomes}}{\text{Total no. of all possible outcomes}}$$

$$= \frac{n(E_2)}{n(S)}$$

$$= \frac{5}{50}$$

$$P(E_2) = \frac{1}{10} \quad (1)$$

(c) factors of 60 $= (E_3) = \{12, 15, 20, 30, 60\}$

$n(E_3) = 5$

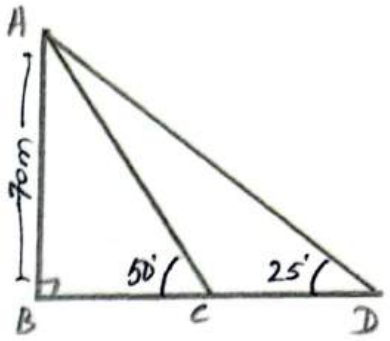
$$P(E_3) = \frac{\text{No. of favourable outcomes}}{\text{Total no. of all possible outcomes}}$$

$$= \frac{n(E_3)}{n(S)} = \frac{5}{50}$$

P(E) should be in lowest form

$$P(E_3) = \frac{1}{10} \quad (1)$$

ii) Let AB be the tower of height 70m



In $\triangle ABC$, $\angle ACB = 50°$, $\angle ABC = 90°$

$\therefore \angle BAC = 180° - (140°)$

$\angle BAC = 40°$

$\tan 40° = \frac{BC}{AB}$

$0.8391 \times 70 = BC$

$\therefore BC = 58.737\ m$ (1)

Similarly, In $\triangle ABD$, $\angle ABD = 90°$; $\angle ADB = 25°$

$\therefore \angle BAD = 180° - 115$

$\angle BAD = 65°$

$\tan 65° = \frac{BD}{AB}$

$2.1445 \times 70 = BD$

$BD = 150.115\ m$ (1)

$\therefore$ Distance b/w two people $= BD - BC$

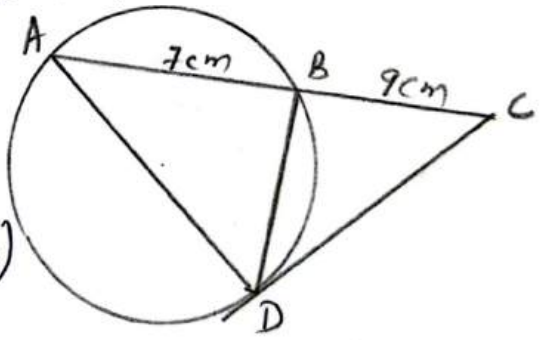
$= 150.115\ m - 58.737\ m$

$= 91.378\ m$ (1)

(iii) $\triangle CDA$ $\triangle CBD$

→ Statement of theorem (1)

$\angle DAC = \angle BDC$ (The angle between a tangent and a chord through the point of contact is equal to an angle in the alternate segment)



(1) (Both to be correct)

$\angle DCA = \angle BDD$ (Common angle)

$\therefore \triangle CDA \sim \triangle CBD$ (AA)

$\frac{CD}{CB} = \frac{CA}{CD}$ (1) (Corresponding sides of similar $\triangle$ are proportional)

$CD^2 = CB \times CA$ $\quad \therefore CD = 12\ cm$ (1)

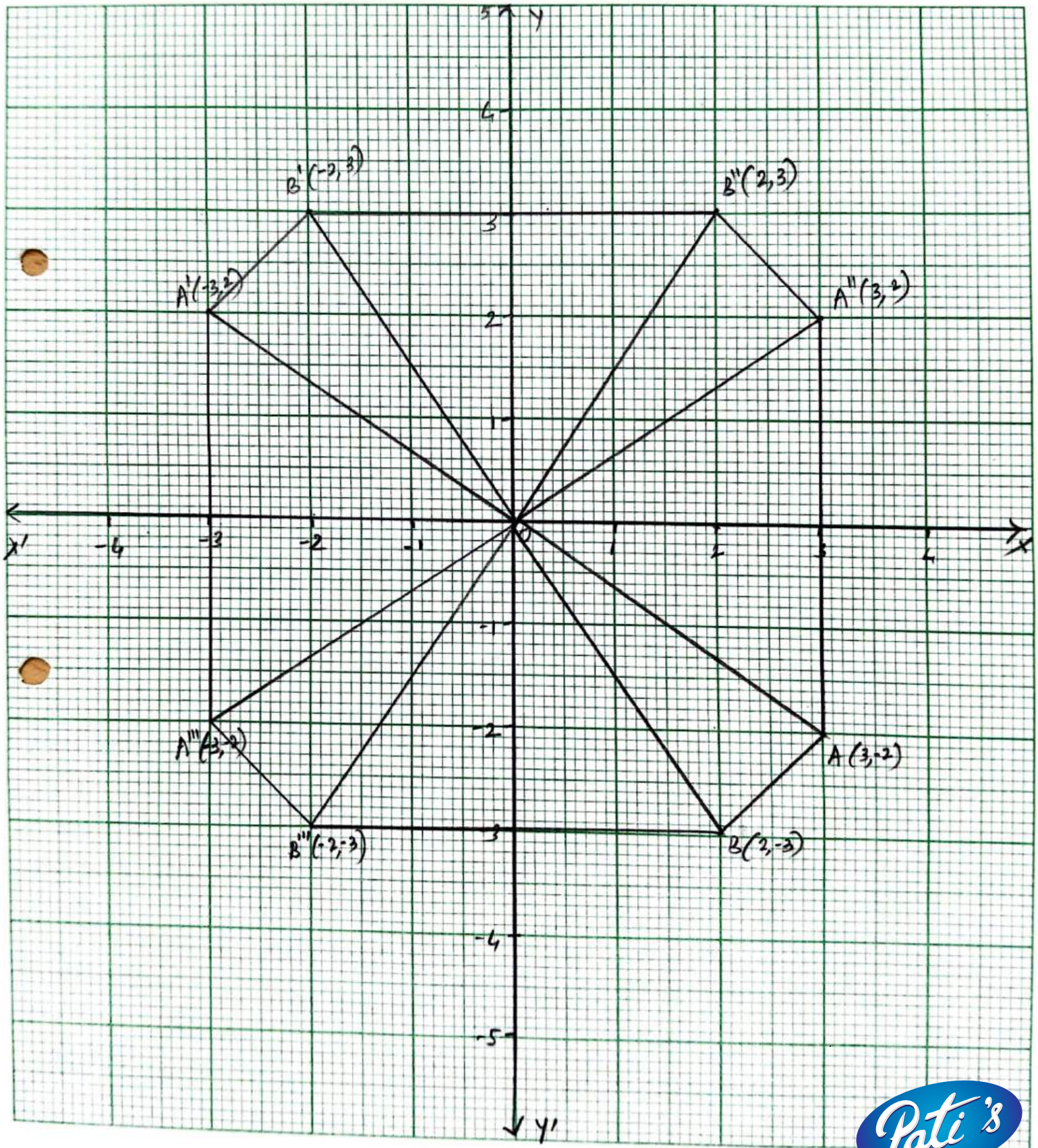
$= 9 \times 16$

Unique ID _____ Index Number _____

Subject _____

Q.No. 7 (i) Signature of Candidate : _____

(Ruled in 2 mm squares)

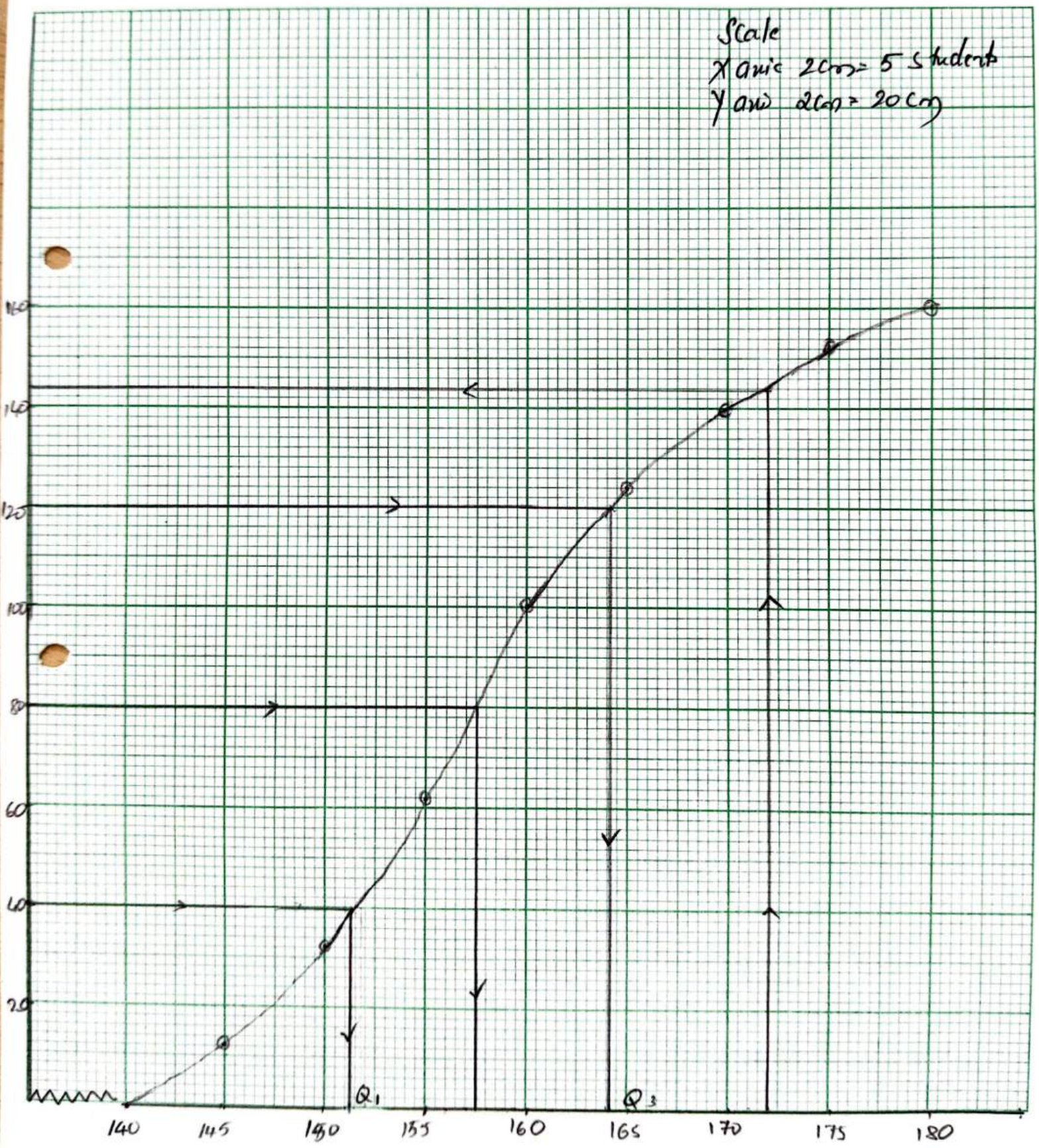


Subject

Q.No. 7(ii)

(Ruled in 2 mm squares)

Signature of Candidate :



Pati's
ICSE ACADEMY

ICSE ACADEMY

KARNATAKA ICSE SCHOOLS ASSOCIATION

ICSE STD. X Preparatory Examination 2025

Subject – Mathematics

Duration: 3 Hours **Maximum Marks: 80** **Date: 07.01.2025**

General Instructions

Answers to this paper must be written on the paper provided separately.

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.***

All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.

Omission of essential working will result in loss of marks.

The intended marks for questions or parts of questions are given in brackets [ ]

Mathematical tables are provided

Instruction for the invigilator

Kindly read aloud the Instructions given above to all the candidates present in the Examination Hall.

SECTION A

*(Attempt **all** questions from this section)*

Question 1

Choose the correct answer to the questions from the given options: [15]
(Do not copy the question, write the correct answers only.)

(i)) If 73 is the n^{th} term of the arithmetic progression 3,8,13,18…then 'n' is

(a) 13

(b) 14

(c) 15

(d) 16

(ii) If $\frac{7m+2n}{7m-2n} = \frac{5}{3}$ then m: n is

(a) 7:8

(b) 2:7

(c) 1:8

(d) 8:7

(iii) A man invests ₹ 24,000 on ₹60 shares at a discount of 20%. If the dividend declared by the company is 10% then his annual income is

(a) ₹2880

(b) ₹1500

(c) ₹3000

(d) ₹5000

(iv) One of the following point is invariant with respect to the line $y = -4$

(a) (3, 4)

(b) (3, -4)

(c) (4, 3)

(d) (-3, 4)

(v) If $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ x Y $= \begin{bmatrix} p \\ q \end{bmatrix}$. The order of the matrix Y is

(a) 2 x 2

(b) 1 x 2

(c) 2 x 1

(d) 1 x 1

(vi) The sum of the probability of an event and its complementary is

(a) 0

(b) 1

(c) < 1

(d) > 1

(vii) In a recurring deposit account, Virat deposits ₹500 per month for 24 months,if the interest he earns is one-tenth of his total deposit, the rate of interest is

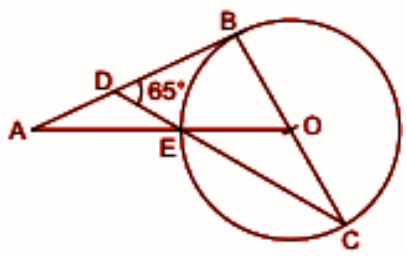
(a) 4.8%

(b) 9.6%

(c) 7.2%

(d) 3.2%

(viii) In the adjoining figure, O is the centre of the circle and AB is a tangent to it at point B. If ∠BDC = 65° then ∠BAO is



(a) 50°

(b) 25°

(c) 65°

(d) 40°

(ix) (sin θ + cos θ) (tan θ + cot θ) =

(a) sec θ + cosec θ

(b) sec θ + cos θ

(c) sec θ

(d) cosec θ

(x) The number of solid spheres, each of diameter 6 cm, that can be made by melting a solid metal cylinder of height 45 cm and diameter 4 cm, is

(a) 2

(b) 4

(c) 5

(d) 6

(xi) Quadrilateral ABCD is circumscribed to a circle. If AB=6 cm, BC=7 cm, and CD= 4 cm then the length of AD is

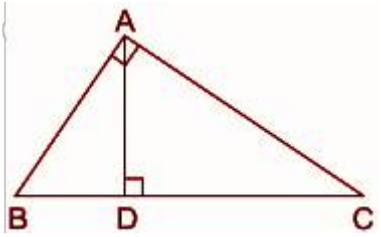
(a) 3cm

(b) 4cm

(c) 6cm

(d) 7cm

(xii) In the given figure, $\angle BAC = 90°$ and $AD \perp BC$. Then,



(a) $BC\ X\ CD = BC^2$

(b) $AB\ X\ AC = BC^2$

(c) $BD\ X\ CD = AD^2$

(d) $AB\ X\ AC = AD^2$

(xiii) Sourav purchases an article for ₹ 5,310 which includes a discount of 10% on the marked price and 18% GST on the selling price. The marked price of the article is

(a)₹ 4,200

(b)₹5,000

(c)₹5,500

(d)₹5,900

(xiv) When $2x^3 - 3x^2 + ax - 9$ is divided by (x+3), the remainder is 6, then the value of 'a' is

(a) 4

(b) -8

(c) -7

(d) -32

(xv) **Assertion(A):**Given two straight lines $3x - 2y = 5$ and $2x + ky + 7 = 0$ are perpendicular to each other when value of k =3

Reason(R): If AB and CD are two mutually perpendicular lines and their inclination be α and θ respectively then $\tan\theta = -\cot\alpha$

(a) Assertion(A) is true but reason(R) is false.

(b) Assertion (A) is false but reason(R) is true.

(c) Both assertion (A) and reason(R) are true and reason(R) is the correct explanation of assertion (A).

(d) Both assertion (A) and reason(R) are true and reason(R) is not the correct explanation of assertion (A).

Question 2

(i) Solve $x - \frac{1}{x} = 3 \neq 0$ and give your answer correct to two decimal places. [4]

(ii) Find the number of terms of a GP whose first term is $\frac{3}{4}$, common ratio is 2 and the last term is 384 and find their sum. [4]

(iii) Find the value of x, which satisfies the given inequation and graph the solution set on number line:

$$-1\frac{5}{6} < \frac{3}{2} - \frac{2x}{3} \leq 3, x \in W$$ [4]

Question 3

(i) A piggy bank contains hundred 50-p coins, fifty ₹1 coins, twenty ₹2 and ten ₹5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, find the probability the coin falling out will be

(a) a 50-p coin,

(b) of value more than ₹1,

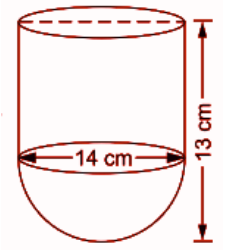
(c) of value less than ₹5

(d) a ₹1 or ₹2 coin. [4]

(ii) A vessel is in the form of a hemispherical bowl mounted by a hollow cylinder of negligible thickness. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find

(a) the capacity of the vessel.

(b) the inner surface area of the vessel. [4]



(iii) Plot points A(0,4),B(1,2),E(0,1),C(3,3),H(3,0) and reflect B,C,H in the Y axis to D,F,G respectively and reflect E in the X axis to J.Write the coordinates of reflected points. Join A,B,E,D,A and also E,C,H,J,G,F,E in order and name the geometrical figures separately. Take scale as 2 cm = 1 unit on both the axes. [5]

SECTION B

*(Attempt **any four** questions from this Section.)*

Question 4

(i) Find x and y if: $\begin{bmatrix} 5 & 4 \\ -2 & 6 \end{bmatrix}\begin{bmatrix} 4x \\ 3 \end{bmatrix}+2\begin{bmatrix} 5 \\ 7 \end{bmatrix}=6\begin{bmatrix} 7 \\ y \end{bmatrix}$ [3]

(ii) Rohit deposits a certain sum of money every month in a recurring deposit account for 2 years. If the bank pays interest at 10% p.a. and Rohit receives ₹66,250 as the maturity value of the account, what sum of money did he pay every month? [3]

(iii) Use ruler and compasses only for this question.

(a) Construct ΔABC, where AB = 3.5 cm, BC = 6 cm and ∠ABC = 60°.

(b) Construct the locus of points inside the triangle which are equidistant from BA and BC.

(c) Construct the locus of points inside the triangle which are equidistant from B and C.

(d) Mark the point P which is equidistant from AB, BC and also equidistant from B and C. Measure and record the length of PB. [4]

Question 5

(i) SGST on an AC is 14% and the price of the AC including GST is ₹ 57,600. What is the

(a) rate of GST?

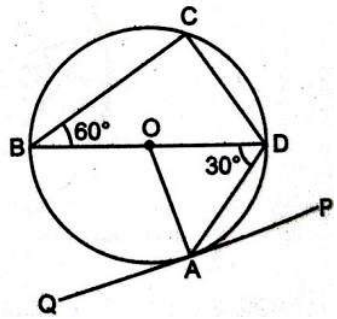
(b) price of AC before GST?

(c) amount of GST [3]

(ii) The distance between Mumbai and Pune is 192 km. Travelling by the Deccan Queen, it takes 48 minutes less than another train. Calculate the speed of the Deccan Queen if the speeds of the two trains differ by 20 km/hr. [3]

(iii) The horizontal distance between two towers is 120 m.The angle of elevation of the top and the angle of depression of the bottom of first tower as observed from the top of second tower are 30° and 24° respectively. Find the height of the two towers and give your answer to three significant figures. [4]

Question 6



(i) In the given figure, PQ is a tangent to the circle at A.
BD is a diameter and O is the centre.
If ∠ADB = 30° and ∠DBC = 60°, find :
(a) ∠QAB
(b) ∠PAD
(c) ∠CDB [3]

(ii) Find the sum of first n terms of an AP whose n^{th} term is (5n-1).Hence, find the sum of the first 20 terms. [3]

(iii) Use remainder theorem to factorise the expression $2x^3 + 9x^2 + 7x - 6$. Hence solve the equation $2x^3 + 9x^2 + 7x - 6 = 0$. [4]

Question 7

(i) Prove that $(\sin\theta + \text{cosec}\,\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$ [3]

(ii) If $\frac{\sqrt{x+2} + \sqrt{x-3}}{\sqrt{x+2} - \sqrt{x-3}} = 5$, Use the properties of proportion and solve for x. [3]

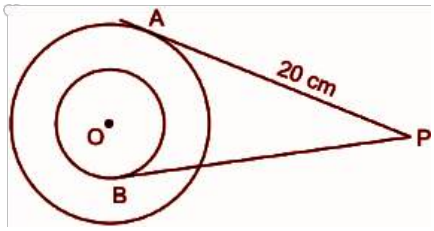
(iii) The weight of 50 apples were recorded as given below .Calculate the mean weight, to the nearest gram, by step deviation method.

Weight in grams	80-85	85-90	90-95	95-100	100-105	105-110	110-115
No.of apples	5	8	10	12	8	4	3

[4]

Question 8

(i) In the given figure, O is the centre of two concentric circles with radii 7 cm and 15 cm.
If AP and BP are tangents to the circles and AP = 20 cm, find the length of BP. [3]



(ii) The toy model of a truck and a real truck are in the ratio 1: 60.
(a) Calculate the length of the truck, in metres, if the length of the model is 25 cm.
(b) If the open area of loading of the truck is 90 m^2, find the same area of the model in cm^2.
(c) If the volume of the model is 7500 cm^3,find the volume of the truck in m^3. [3]

(iii) Points A and B have coordinates $(7, -3)$ and $(1,9)$ respectively.Find
(a) the slope of AB.
(b) the equation of the perpendicular bisector of the line segment AB.
(c) the value of $'p'$ if $(-2, p)$ lies on perpendicular bisector. [4]

Question 9

(i) Use graph paper for this question.
The marks obtained by 100 students in an English test are given below.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No.of students	5	9	12	14	20	16	11	6	4	3

Draw the ogive and estimate
(a) the median marks.
(b) the number of students who did not pass the test if the pass percentage was 50.
(c) the upper quartile marks.(Take 2 cm = 10 units on both the axes) [6]

(ii) Using ruler and compass construct a triangle ABC in which AB=6 cm,$\angle$ABC = 120° and BC=5 cm.Construct a circle passing through A,B and C.Measure and write down the radius of the circle. [4]

Question 10

(i) In ΔABC, DE $\parallel$ BC. If area of ΔADE**:** area of DBCE = 9: 16, find the ratio of AD: DB. [3]

(ii) Find the ratio in which the point (3, b) divides the segment joining the points A (7, 1) and B (0, 8). Find the value of b. [3]

(iii) Surya invests ₹4500 in 8%, ₹10 shares at ₹15.He sells the shares when the price rises to ₹30 and invests the proceeds in12% ₹100 shares at ₹125.Calculate
(a) the sale proceeds
(b) the number of ₹125 shares bought by Surya.
(c) the change in the annual income. [4]

KISA PREPARATORY EXAMINATION

ANSWER KEY.

2024-2025

SUBJECT: MATHEMATICS

Question 1 $15 \times 1 = 15$

i) c) 15

ii) d) 8:7

iii) c) ₹3000

iv) b) (3, -4)

v) c) 2×1

vi) b) 1

vii) b) 9.6%

viii) d) 40°

ix) a) $\sec\theta + \operatorname{cosec}\theta$

x) c) 5

xi) a) 3 cm

xii) c) $BD \times CD = AD^2$

xiii) b) ₹5000

xiv) d) -32

xv) c) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Question 2

[4]

(i) $x - \frac{1}{x} = 3, \quad x \neq 0$

$$\frac{x^2-1}{x} = 3$$

$$x^2 - 1 = 3x$$

$$x^2 - 3x - 1 = 0 \quad (1)$$

Here, $a = 1, \ b = -3, \ c = -1$

By quadratic formula

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$= -\frac{(-3) \pm \sqrt{(-3)^2 - 4(1)(-1)}}{2(1)}$$

} Formula & Substitution (1)

$$= \frac{3 \pm \sqrt{9+4}}{2}$$

$$= \frac{3 \pm \sqrt{13}}{2}$$

$$x = \frac{3 \pm 3.606}{2} \quad (1)$$

$$x = \frac{3+3.606}{2} \qquad x = \frac{3-3.606}{2}$$

$$= \frac{6.606}{2} \qquad = \frac{-0.606}{2}$$

$$= 3.303 \qquad = -0.303$$

$$= 3.30 \qquad = -0.30$$

(1) (Both the values to be correct)

[4]

(ii) For the given G.P.

$$a = \frac{3}{4}, \ r = 2, \ a_n = 384$$

$$a_n = a r^{n-1}$$

$$384 = \left(\frac{3}{4}\right)(2)^{n-1}$$

} Formula & Substitution (1)

$$\frac{384 \times 4}{3} = (2)^{n-1}$$

$2^9 = (2)^{n-1}$

$9 = n-1$

$\therefore n = 10$ (1)

Next,

$S_n = \frac{a(r^n-1)}{r-1}$, since $|r|>1$ } formula & Substitution (1)

$= \frac{\left(\frac{3}{4}\right)\left[2^{10}-1\right]}{2-1}$

$= \left(\frac{3}{4}\right)(1024-1)$

$= \left(\frac{3}{4}\right)(1023)$

$= \frac{3069}{4}$

$S_{10} = 767\frac{1}{4}$ (1)

(iii) $-1\frac{5}{6} < \frac{3}{2} - \frac{2x}{3} \leq 3, \quad x \in W$ [4]

$-\frac{11}{6} < \frac{3}{2} - \frac{2x}{3}$ and $\frac{3}{2} - \frac{2x}{3} \leq 3$

$\frac{2x}{3} < \frac{3}{2} + \frac{11}{6}$ and $\frac{3}{2} - \frac{3}{1} \leq \frac{2x}{3}$

$\frac{2x}{3} < \frac{20}{6}$ and $\frac{3-6}{2} \leq \frac{2x}{3}$ (1)

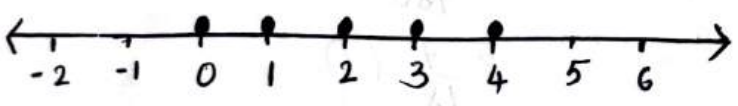
$x < \frac{20}{6} \times \frac{3}{2}$ and $-\frac{3}{2} \times \frac{3}{2} \leq x$

$x < 5$ and $-\frac{9}{4} \leq x$

$-2\frac{1}{4} \leq x$

$-2\frac{1}{4} \leq x < 5, \quad x \in W$ (1)

solution set: $\{0, 1, 2, 3, 4\}$ (1)



(1) [Atleast two no. to be written on both side of sol. set and arrow head to be shown]

Question 3

[4]

(i) $n(S) = (100+50+20+10) = 180$

(a) No. of favourable outcomes = 100

$$P(\text{getting a 50p coin}) = \frac{\text{No. of favourable outcomes}}{\text{Total no. of all possible outcomes}}$$

$$= \frac{100}{180}$$

$$= \frac{5}{9} \quad (1)$$

(b) No. of favourable outcomes = 20+10 = 30

$$P(\text{getting a coin of value more than ₹1}) = \frac{\text{No. of favourable outcomes}}{\text{Total no. of all possible outcomes}}$$

$$= \frac{30}{180}$$

$$= \frac{1}{6} \quad (1)$$

(c) No. of favourable outcomes = (100+50+20) = 170

$$P(\text{getting a coin of value less than ₹5}) = \frac{\text{No. of favourable outcomes}}{\text{Total no. of all possible outcomes}}$$

$$= \frac{170}{180}$$

$$= \frac{17}{18} \quad (1)$$

(d) No. of favourable outcomes = 50+20 = 70

$$P(\text{getting a ₹1 or ₹2 coin}) = \frac{\text{No. of favourable outcomes}}{\text{Total no. of all possible outcomes}}$$

$$= \frac{70}{180}$$

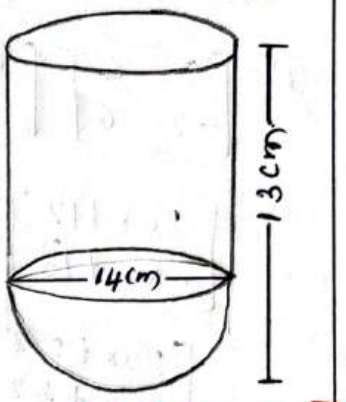
$$= \frac{7}{18} \quad (1)$$

(Atleast in one subquestion formula to be written or else OW-1)

(ii) For hemisphere, $r = 7cm$

For cylinder, $r = 7cm$, $h = 6cm$

[4] (5)



(a) Capacity of the Vessel $= \pi r^2 h + \frac{2}{3}\pi r^3$

$= \pi r^2\left(h + \frac{2}{3}r\right)$

$= \frac{22}{7}(7)^2\left[6 + \frac{2}{3}(7)\right]$ (1)

$= \frac{22}{7} \times 49\left[6 + \frac{14}{3}\right]$ → [Formula & Substitution]

$= 154\left(\frac{32}{3}\right)$

$= \frac{4928}{3}\ cm^3$

$= 1642\frac{2}{3}\ cm^3$ (1)

(b) The inner surface area of the vessel $= 2\pi rh + 2\pi r^2$

$= 2\pi r(h + r)$

$= 2 \times \frac{22}{7} \times 7(6 + 7)$ (1)

$= 44 \times 13$

$= 572\ cm^2$ (1)

(iii) [5]

. $M_y B(1, 2) = D(-1, 2)$; $M_y C(3,3) = F(-3,3)$; $M_y H(3,0) = G(-3,0)$ → Any two (1)

. ABEDA is a kite (1)

. ECHJGFE is a concave hexagon (or) concave six sided polygon (1)

. plotting A, B, E, C, H (1) (any 3)

. plotting D, F, G (1)

[If wrong scale ow-1]

Question 4

[3]

(i) $\begin{bmatrix} 5 & 4 \\ -2 & 6 \end{bmatrix} \begin{bmatrix} 4x \\ 3 \end{bmatrix} + 2\begin{bmatrix} 5 \\ 7 \end{bmatrix} = 6\begin{bmatrix} 7 \\ y \end{bmatrix}$

$\begin{bmatrix} 20x+12 \\ -8x+18 \end{bmatrix} + \begin{bmatrix} 10 \\ 14 \end{bmatrix} = \begin{bmatrix} 42 \\ 6y \end{bmatrix}$ (1)

$\begin{bmatrix} 20x+22 \\ -8x+32 \end{bmatrix} = \begin{bmatrix} 42 \\ 6y \end{bmatrix} \Rightarrow 20x+22=42$; $-8(1)+32=6y$

$x = 1$ (1) $\quad 24 = 6y$

$y = 4$ (1)

[3]

(ii) $n = 24$, $r = 10\%$ pa, $MV = ₹66,250$

$I = \frac{P \times n \times (n+1)}{2 \times 12} \times \frac{r}{100}$

$= \frac{P \times 24 \times 25}{2 \times 12} \times \frac{10}{100}$ (1)

$I = \frac{5P}{2}$ (1)

$\therefore MV = Pn + I$

$66250 = P \times 24 + \frac{5P}{2}$

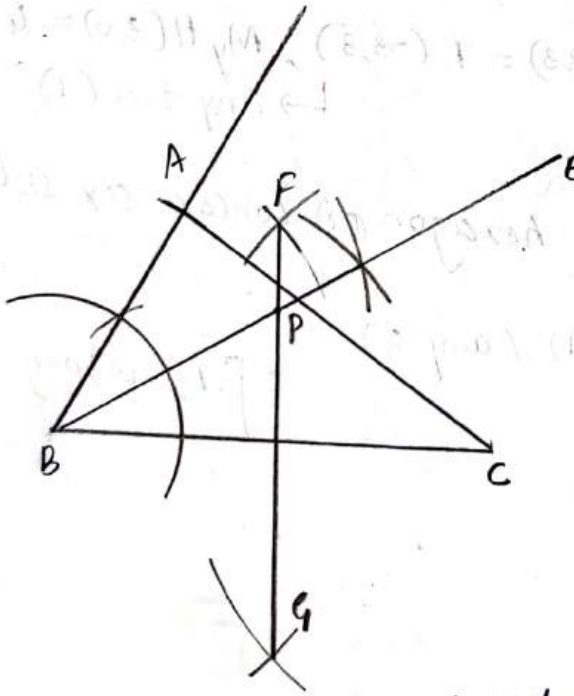
$66250 = \frac{53P}{2}$

$\therefore P = \frac{66250 \times 2}{53}$

$P = ₹2500$ (1)

(iii)

[4]



- Construction of triangle (1)
- Angular bisector of $\angle B$ (1)
- Perpendicular bisector of BC (1)
- $BP = 3.5\,cm \pm 0.1\,cm$ (1)

- Any point on BE is locus of a point equidistant from AB & BC
- any point on the line PQ is locus of a point equidistant from points B & C. If these sentences are not written ⇒ ow-1

Question 5

[3]

(i) a) If SGST = 14%

$\Rightarrow$ GST rate = 14 + 14 = 28% (1)

(b) Let the price of Ac without GST = ₹ x

$$x + \frac{28}{100}x = 57600$$

$$x + \frac{7x}{25} = 57600$$

$$\frac{32x}{25} = 57600 \Rightarrow x = \frac{57600 \times 25}{32}$$

$$\therefore x = 45000$$

$\therefore$ Let the price of Ac without GST = ₹ 45,000 (1)

(c) Amount of GST = ₹57600 − ₹45000

= ₹ 12,600 (1)

[3]

(ii) Let the speed of Deccan Queen = x km/h

Speed of another train = (x-20) km/h

Distance to be travelled = 192 km

Time taken by Deccan Queen = $\frac{192}{x}$ hour

Time taken by another train = $\frac{192}{x-20}$ hour

Now, $\frac{192}{x-20} - \frac{192}{x} = \frac{48}{60}$ (1)

$$48\left(\frac{4}{x-20} - \frac{4}{x}\right) = \frac{48}{60}$$

$$\frac{4x - 4(x-20)}{x(x-20)} = \frac{1}{60}$$

$$(4x - 4x + 80)60 = x^2 - 20x$$

$$4800 = x^2 - 20x$$

$\therefore x^2 - 20x - 4800 = 0$ (1)

$x^2 - 80x + 60x - 4800 = 0$

$x(x-80) + 60(x-80) = 0$

$(x-80)(x+60) = 0$

$x - 80 = 0$ or $x + 60 = 0$

$x = 80$ or $x = -60$

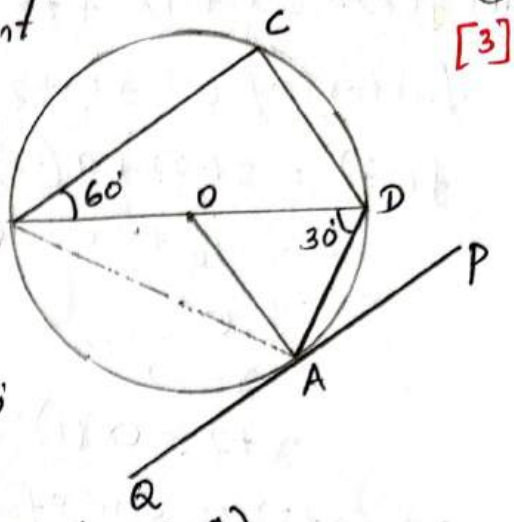
Ignored as speed can't be negative

$\therefore$ Speed of Deccan Queen = 80 km/h (1)

Question 6 [3]

(i) a) $\angle QAB = \angle BDA$ (∵ The angle between a tangent and a chord through the point of contact is equal to an angle in the alternate segment)

$\therefore \angle QAB = 30^\circ$ (1)



(b) In $\triangle BAD$, $\angle BAD = 90^\circ$ (Angle in the semi circle is 90°)

$\therefore \angle BAD + \angle BDA + \angle ADB = 180^\circ$ (Angle sum property of Δ)

$90^\circ + 30^\circ + \angle ABD = 180^\circ$

$\therefore \Rightarrow \angle ABD = 60^\circ$

but $\angle ABD = \angle PAD$ (The angle between a tangent and a chord through the point of contact is equal to an angle in the alternate segment)

$\therefore \angle PAD = 60^\circ$ (1)

(c) In $\triangle BCD$, $\angle BCD = 90^\circ$ (Angle in the semi circle is 90°)

$\angle BCD + \angle CBD + \angle CDB = 180^\circ$ (Angle sum property of Δ)

$90^\circ + 60^\circ + \angle CDB = 180^\circ$

$\therefore \angle CDB = 30^\circ$ (1)

[Atleast one reason to be correct or else ⊗w -1]

(ii) [3]

$a_n = 5n - 1$

$a_1 = 5(1) - 1$

$a_1 = 4$

$a_2 = 5(2) - 1$

$a_2 = 9$

$d = a_2 - a_1$

$= 9 - 4$

$d = 5$ (1)

$\therefore S_n = \frac{n}{2}[2a + (n-1)d]$

$= \frac{n}{2}[2(4) + (n-1)(5)]$

$= \frac{n}{2}[8 + 5n - 5]$

$S_n = \frac{n}{2}[5n + 3]$ (1)

$\therefore$ Sum of first 'n' terms $= \frac{n}{2}[5n + 3]$

$S_{20} = \frac{20}{2}[5(20) + 3]$

$S_{20} = 1030$ (1)

(iii) $f(x) = 2x^3 + 9x^2 + 7x - 6$ [4]

factors of 6 = $\pm 1, \pm 2, \pm 3, \pm 6$

$f(-2) = 2(-2)^3 + 9(-2)^2 + 7(-2) - 6$

$= -16 + 36 - 14 - 6$

$= 0$

$\therefore x = -2$

$x + 2 = 0$ (1)

$\Rightarrow (x+2)$ is one of the factor of $f(x)$

$$
\begin{array}{r|l}
 & 2x^2 + 5x - 3 \quad (1) \\
\hline
x+2 & 2x^3 + 9x^2 + 7x - 6 \\
(-) & 2x^3 + 4x^2 \quad (-) \\
\hline
 & 5x^2 + 7x \\
 & (-)\ 5x^2 + 10x \quad (-) \\
\hline
 & -3x - 6 \\
 & -3x - 6 \\
 & (+)\quad (+) \\
\hline
 & 0
\end{array}
$$

$\therefore f(x) = (x+2)(2x^2 + 5x - 3)$

$= (x+2)(2x^2 + 6x - x - 3)$

$= (x+2)[2x(x+3) - 1(x+3)]$

$f(x) = (x+2)(x+3)(2x-1)$ (1) [No commas in between]

Next, $(x+2)(x+3)(2x-1) = 0$

$\therefore x + 2 = 0 \mid x + 3 = 0 \mid 2x - 1 = 0$

$x = -2 \mid x = -3 \mid x = \frac{1}{2}$ (1) [All three to be correct]

Question 7

(i) To prove: $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$ [3]

LHS: $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2$

$= \sin^2\theta + \operatorname{cosec}^2\theta + 2\sin\theta \cdot \operatorname{cosec}\theta + \cos^2\theta + \sec^2\theta + 2\cos\theta \cdot \sec\theta$ (1)

$[\because (a+b)^2 = a^2 + b^2 + 2ab]$

$= \sin^2\theta + \cos^2\theta + (1 + \cot^2\theta) + (1 + \tan^2\theta) + 2\sin\theta \cdot \frac{1}{\sin\theta} + 2\cos\theta \cdot \frac{1}{\cos\theta}$ (1)

$= 1 + 1 + \cot^2\theta + 1 + \tan^2\theta + 2 + 2$

$= 7 + \tan^2\theta + \cot^2\theta$ (1)

$= RHS$

$[\because \sin^2\theta + \cos^2\theta = 1$
$\operatorname{cosec}^2\theta = 1 + \cot^2\theta$
$\sec^2\theta = 1 + \tan^2\theta]$

[At least one reason to be given or else ow -1]

(ii) $\frac{\sqrt{x+2} + \sqrt{x-3}}{\sqrt{x+2} - \sqrt{x-3}} = \frac{5}{1}$ [3]

Applying Componendo and dividendo

$\frac{\sqrt{x+2} + \sqrt{x-3} + \sqrt{x+2} - \sqrt{x-3}}{\sqrt{x+2} + \sqrt{x-3} - \sqrt{x+2} + \sqrt{x-3}} = \frac{5+1}{5-1}$ (1) [For applying C-d correctly]

$\frac{2\sqrt{x+2}}{2\sqrt{x-3}} = \frac{6}{4}$

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

Squaring on both side

$\frac{x+2}{x-3} = \frac{9}{4}$ (1)

$4x + 8 = 9x - 27$

$5x = 35$

$x = 7$ (1)

(iii) [4]

CI	f	x	d = x − A	$t = \frac{d}{i}$	ft	
80-85	5	82.5	−15	−3	−15	
85-90	8	87.5	−10	−2	−16	−41
90-95	10	92.5	−5	−1	−10	
95-100	12	97.5	0	0	0	
100-105	8	102.5	5	1	8	
105-110	4	107.5	10	2	8	25
110-115	3	112.5	15	3	9	
	N = 50				Σft = −16	

Let A = 97.5 (His), i = 5

Mean $(\bar{x}) = A + \frac{\Sigma ft}{N} \times i$

$= 97.5 + \frac{-16}{50} \times 5$ } (1) (Correct formula & substitution)

$= 97.5 - 1.6$

$= 95.9$

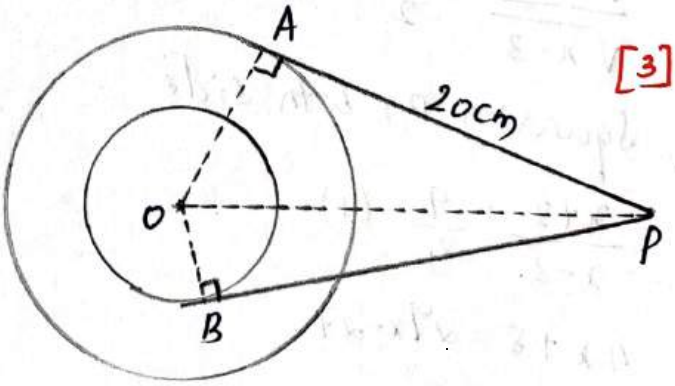
$= 96$ g (1)

• Any 4 'x' correct = (1)

• Any 4 'ft' correct = (1)

Question 8

[3]



(i) Join OA, OB, OP

In Δ OAP, ∠OAP = 90°

[∵ Angle between a tangent and radius at the point of contact is 90°],

AP = 20cm, OA = 15 cm

∴ $OP^2 = OA^2 + AP^2$ (By Pythagoras Theorem)

$OP^2 = 15^2 + 20^2$ —(1)

$= 225 + 400$

$= 625$

$OP = 25$ cm (1)

Next,

In $\triangle OBP$, $\angle OBP = 90°$ [Angle between a tangent and radius at the point of contact is 90°]

$OP^2 = OB^2 + BP^2$ (By Pythagoras theorem)

$25^2 = 7^2 + BP^2$ —(2)

$\therefore BP^2 = 625 - 49$

$BP^2 = 576$

$\therefore BP = 24$ cm (1)

For eq (1) or (2) = 1 mark

[Any one reason to be given or else ow -1]

[3]

(ii) Scale factor = 1:60

$K = \frac{1}{60}$

(a) Length of model = K x length of truck

$25 \text{ cm} = \frac{1}{60} \times$ length of truck

Length of truck $= 25 \times 60$

$= 1500$ cm

$= 15$ m (1)

(b) Area of loading of the model = K^2 x Area of loading of the truck

Area of loading of the truck $= \left(\frac{1}{60}\right)^2 \times 90 \text{ m}^2$

$= \frac{1}{3600} \times 90 \times 10000 \text{ cm}^2$

$= 250 \text{ cm}^2$ (1)

(c) Volume of the model of the truck $= k^3 \times$ Volume of the truck

$7500\ cm^3 = \left(\frac{1}{60}\right)^3 \times$ Volume of the truck

$7500 \times 216 \times 1000 =$ Volume of the truck

$1620 \times 10^6\ cm^3 =$ Volume of the truck

$16\ 20 m^3 =$ Volume of truck

$\therefore$ Volume of truck $= 1620\ m^3$ (1)

(iii) $A(7, -3)$, $B(1, 9)$ [4]

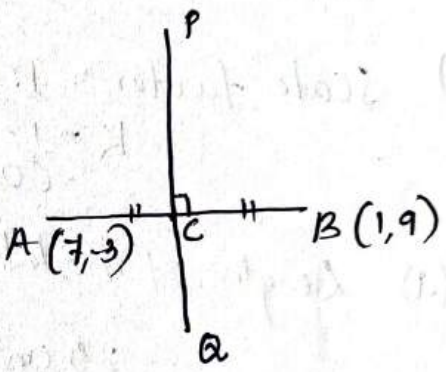
(a) Slope of $AB = \frac{9-(-3)}{1-7}$

$= \frac{12}{-6}$

$m_1 = -2$ (1)

(b) Slope of line perpendicular to $AB = \frac{-1}{\text{slope of } AB}$

$m_2 = \frac{1}{2}$



Since PQ is perpendicular bisector of AB

$\Rightarrow$ C is midpoint of AB.

By midpoint formula, $C = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$= \left(\frac{7+1}{2}, \frac{-3+9}{2}\right)$

$= (4, 3)$ (1)

Equation of PQ, by point slope form,

$y - y_1 = m(x - x_1)$

$y - 3 = \frac{1}{2}(x - 4)$

$2y - 6 = x - 4$

$x - 2y + 2 = 0$ (1)

(c) If (-2, p) lies on PQ,

$x - 2y + 2 = 0$

$-2 - 2(p) + 2 = 0$

$-2p = 0$

$\therefore p = 0$ (1)

Question 9

[6]

(i)

Marks (CI)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students (f)	5	9	12	14	20	16	11	6	4	3
cf	5	14	26	40	60	76	87	93	97	100

(a) $N = 100$

Median $= \left(\frac{N}{2}\right)^{th}$ score

$= \left(\frac{100}{2}\right)^{th}$ score

$= 50^{th}$ score

$= 45 \pm 2$ (1)

(b) the no. of students who did not pass the test if the pass % was 50 $= 60 \pm 2$ (1)

(c) The upper quartile marks $(Q_3) = \left(\frac{3N}{4}\right)^{th}$ score

$= \left(\frac{3 \times 100}{4}\right)^{th}$ score

$= 75^{th}$ score

$= 59 \pm 2$ (1)

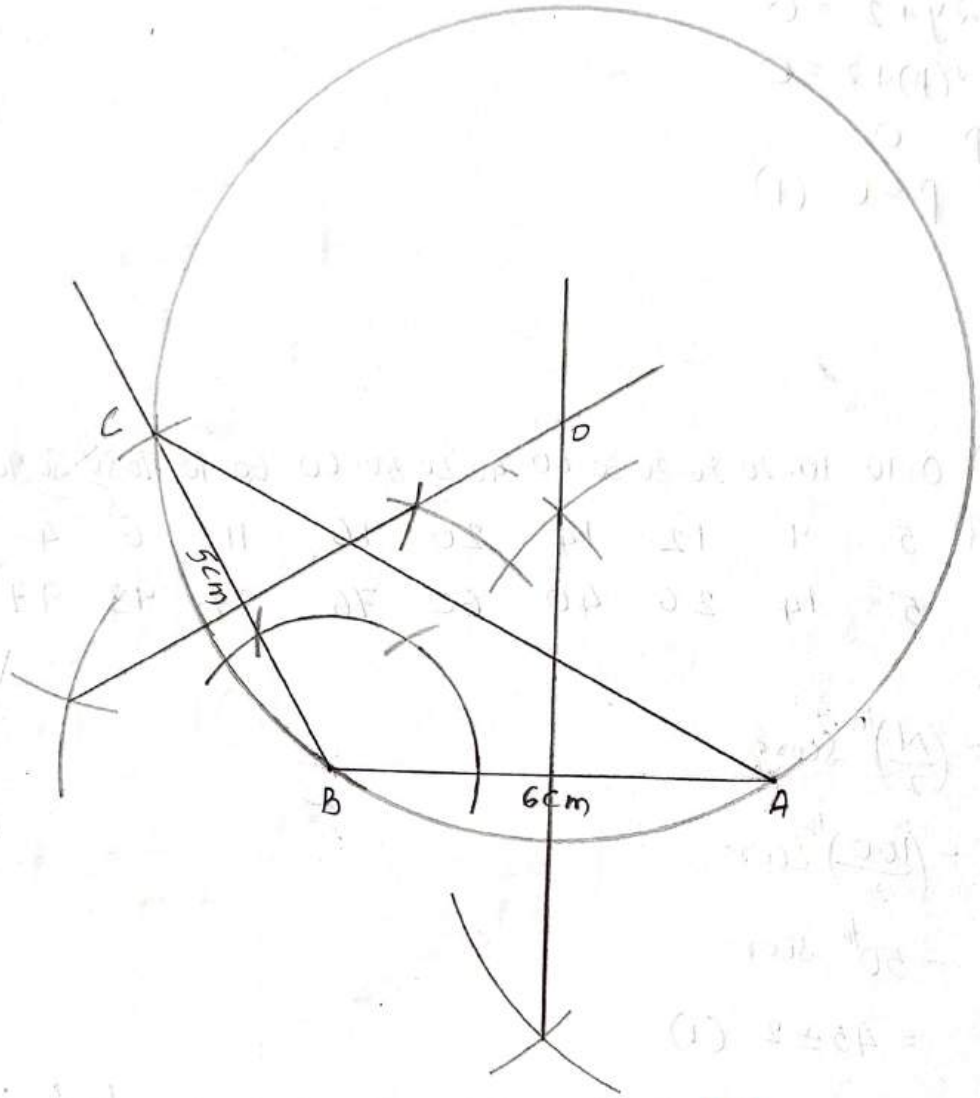
(·) Any 6 correct cf (1)

(·) plotting the points correctly (Upper limit v/s cf) (1)

(·) Smooth ogive with guiding lines (1)

[If no guiding lines or wrong scale is taken → OW-1]

(ii) [4]



(•) Correct construction of $\triangle ABC$ (1)

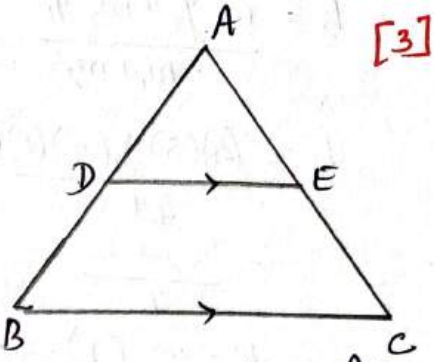
(•) Perpendicular bisector of any two sides (1)

(•) Accurate circumcircle passing through A, B, C (1)

(•) circumradius = 5.5 cm ± 0.2 (1)

Question 10

(i) [3]



$\triangle ADE$ $\triangle ABC$

Proving Similarity (1):
- $\angle DAE = \angle BAC$ (common angles)
- $\angle ADE = \angle ABC$ (corresponding angles)
- $\therefore \triangle ADE \sim \triangle ABC$ (AA similarity)

$$\therefore \frac{\text{Area of } \triangle ADE}{\text{Area of } \triangle ABC} = \frac{AD^2}{AB^2} \quad (1)$$

[∵ Areas of two similar Δles are proportional to the squares of their corresponding sides]

$$\frac{\text{Area of } \triangle ADE}{\text{Area of } \triangle ADE + \text{Area of } DBCE} = \frac{AD^2}{AB^2}$$

[If reason is not written → OW −1]

$$\frac{9}{9+16} = \frac{AD^2}{AB^2}$$

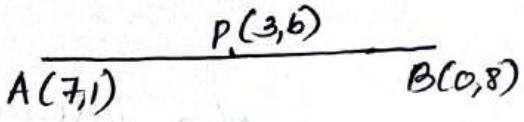
$$\frac{9}{25} = \frac{AD^2}{AB^2} \Rightarrow \frac{AD}{AB} = \frac{3}{5}$$

$$\therefore \frac{AD}{DB} = \frac{3}{5-3} = \frac{3}{2} \quad \therefore AD : DB = 3 : 2 \quad (1)$$

[3]

(ii) $(x_1, y_1) = (7, 1)$; $(x_2, y_2) = (0, 8)$

$P(x, y) = (3, 0)$



Let the required ratio $= m_1 : m_2$

By section formula

$$P(x, y) = \left(\frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2} \right)$$

$$\therefore 3 = \frac{m_1(0) + m_2(7)}{m_1 + m_2} \quad (1)$$

$$3m_1 + 3m_2 = 7m_2$$

$$3m_1 = 4m_2$$

$$\frac{m_1}{m_2} = \frac{4}{3} \quad \therefore m_1 : m_2 = 4 : 3, \text{ Required ratio} = 4 : 3 \quad (1)$$

[should be in ratio form only]

Next

$$b = \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2}$$

$$b = \frac{(4)(8) + (3)(1)}{4+3}$$

$$= \frac{32+3}{7}$$

$b = 5$ (1)

[4]

(iii) No. of shares $= \frac{\text{Investment}}{MV} = \frac{4500}{15} = 300$

(a) Sale proceeds $= ₹(300 \times 30)$

$= ₹9000$ (1)

(b) The no. of ₹125 shares bought by Surya $= \frac{9000}{125}$

$= 72$ (1)

(c) original income = No. of shares bought × Rate of dividend × NV

$= 300 \times \frac{8}{100} \times 10$

$= ₹240$

New income $= 72 \times \frac{12}{100} \times 100$ (1) (Any one correct)

$= ₹864$

∴ Change in annual income $= ₹864 - ₹240$

$= ₹624$. (1)

—THANK YOU—

ICSE ACADEMY

I.C.S.E. 2024

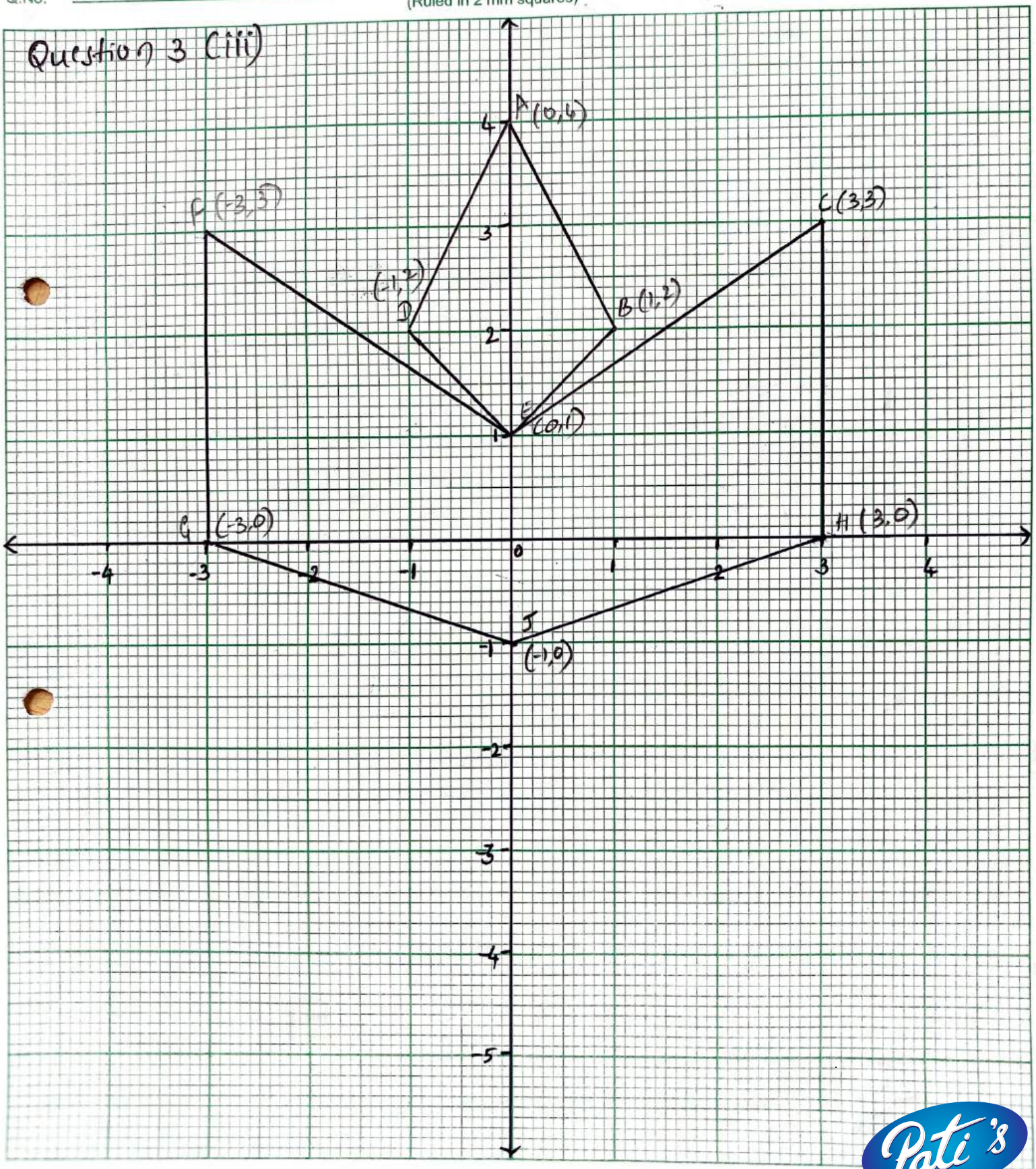
(To be fastened to the answer booklet/s)

Unique ID _____ Index Number _____

Subject _____

Q.No. _____ (Ruled in 2 mm squares) Signature of Candidate : _____

Question 3 (iii)



ICSE ACADEMY

Pati's
ICSE ACADEMY

(To be fastened to the answer booklet/s)

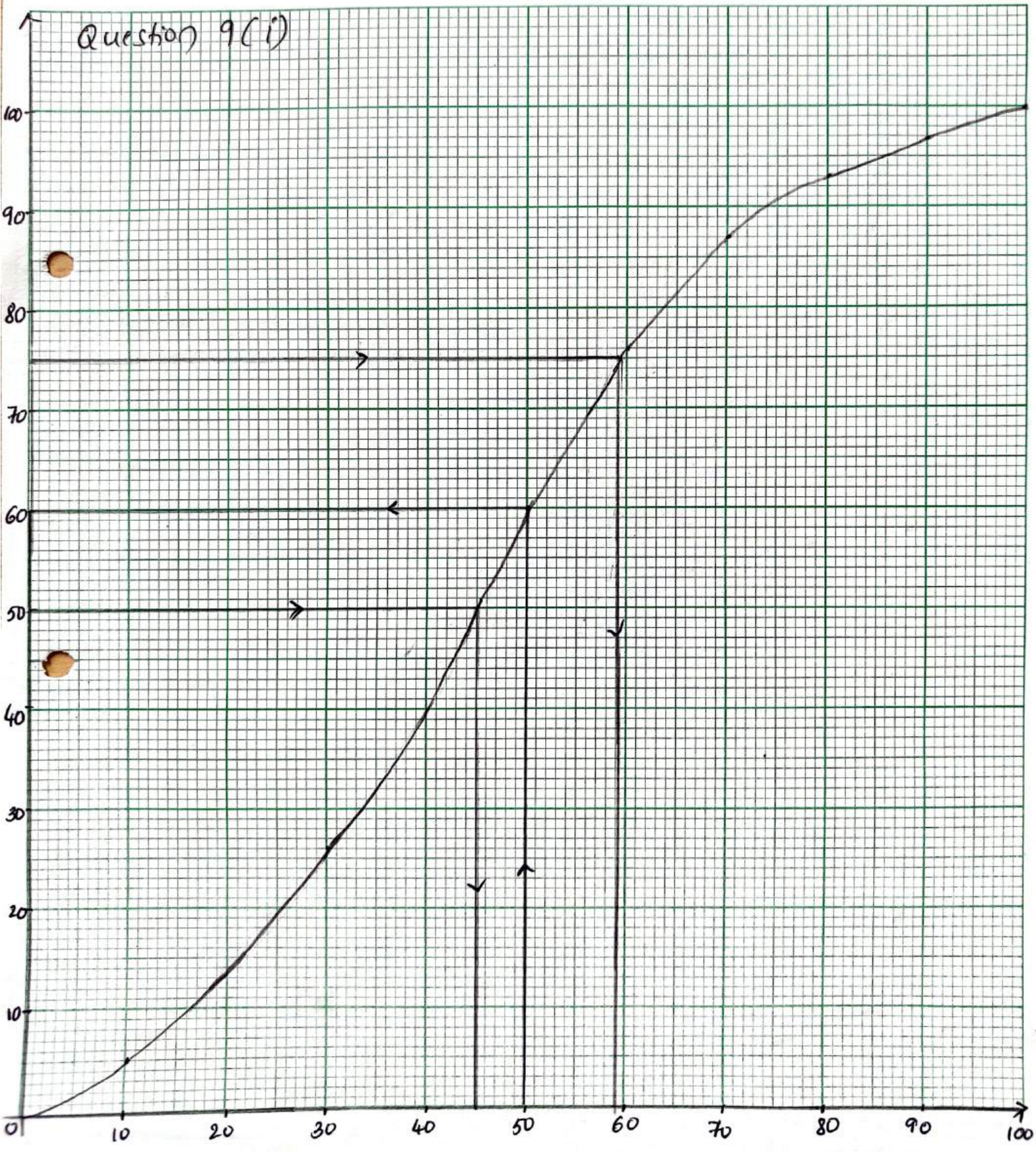
I.C.S.E. 2024

Unique ID _____ Index Number _____

Subject _____

Q.No. _____ Signature of Candidate : _____

(Ruled in 2 mm squares)



KARNATAKA ICSE SCHOOLS ASSOCIATION

ICSE STD. X Preparatory Examination 2024

Subject: Mathematics

Maximum Marks:80 **TimesAllowed: 2 hr. 30 Min.** **Date: 16-01-2024**

Answers to this Paper must be written on the paper provided separately.

You will not be allowed to write during 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.***

All working, including rough work, must be clearly shown, and must be done on the same Sheet as the rest of the answer.

Omission of essential working will result in loss of marks.

The intended marks for questions or parts of questions are given in brackets [ ]

Mathematical tables are provided

SECTION A
(Attempt all questions from this section)

Question 1

Choose the correct answer to the questions from the given options: [15]

(Do not copy the question, write the correct answers only.)

(i) If 2x, x+10 and 3x+2 are in AP, then x =

(a) 0

(b) 2

(c) 4

(d) 6

(ii) If $\begin{bmatrix} x+2y & 3y \\ 4x & 2 \end{bmatrix} = \begin{bmatrix} 0 & -3 \\ 8 & 2 \end{bmatrix}$,then the value of x-y =

(a) -3

(b) 1

(c) 3

(d) 5

(iii) If the lines 2y = 3x+2 and y= ax+5 are perpendicular to each other, then a is

(a) $\frac{3}{2}$

(b) $\frac{2}{3}$

(c) $\frac{-2}{3}$

(d) $\frac{-3}{2}$

(iv) (secA+tanA) (1-sinA) =

(a) sinA

(b) cosA

(c) secA

(d) cosecA

(v) For the following distribution,

Class	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

the sum of the lower limits of the median and modal class is

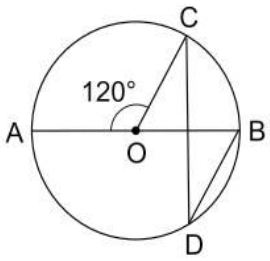
(a) 15

(b) 25

(c) 30

(d) 35

(vi) In the given figure, O is the centre of a circle and $\angle AOC = 120^0$. Then, $\angle BDC$ =



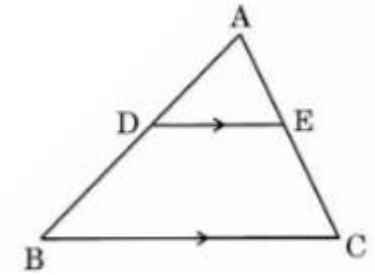
(a) 30º

(b) 45º

(c) 60º

(d) 15º

(vii) In ΔABC, DE ∥ BC. If AD: DB = 2:3, then DE: BC equal to



(a) 2: 3

(b) 3: 5

(c) 2: 5

(d) 3: 2

(viii) The selling price of a shirt including GST is ₹896. If the rate of GST is 12% then the price of the shirt is

(a) ₹704

(b) ₹96

(c) ₹800

(d) ₹848

(ix) The ratio of radii of two cylinders is 2:3 and the ratio of their heights is 5:3. The ratio of their volumes is

(a) 10:17

(b) 20:27

(c) 17:27

(d) None of these

(x) Money required to buy 400 shares of ₹ 12.50 each at a premium of ₹1 is

(a) ₹5000

(b) ₹4600

(c) ₹6250

(d) ₹5400

(xi) The point (-2, 3) is invariant under the reflection of the line

(a) x=-2

(b) y = 3

(c) none of (a) and (b)

(d) both of (a) and (b)

(xii) If x: y = 3:4, then (7x+3y): (7x-3y) is equal to

(a) 5:2

(b) 4:3

(c) 11:3

(d) 37:19

(xiii) The solution set for $5-3x \geq -2x+2$, $x \in W$ is

(a) {0, 1, 2, 3}

(b) {0, 1, 2}

(c) {1, 2, 3……..}

(d) {-3,-2,-1, 0, 1, 2, 3}

(xiv) The midpoint of the line joining A (3, 5) and B(x, y) is (2, 3), then B(x, y) is

(a) (5, 2)

(b) (1, 1)

(c) (-2,-2)

(d) (2, 3)

(xv) **Assertion (A)** From a point P, 10 cm away from the centre of a circle, a tangent PT of length 8 cm is drawn, then the radius of the circle is 5 cm.

Reason (R) A line drawn through the end of a radius and perpendicular to it is a tangent to the circle.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(c) (A) is true but (R) is false

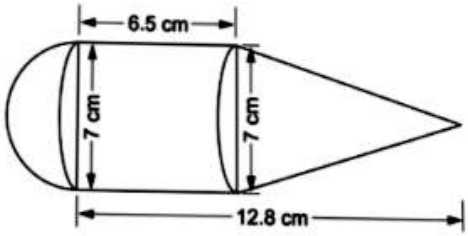
(d) (A) is false but (R) is true

Question 2

(i) Prove that $\frac{\text{cosec}\,\theta}{(\text{cosec}\,\theta-1)} + \frac{\text{cosec}\,\theta}{(\text{cosec}\,\theta+1)} = 2\sec^2\theta$ [4]

(ii) Mr. Mehta deposits a certain sum of money each month in a Recurring Deposit Account of a bank. If the rate of interest is of 8% per annum and Mr. Mehta gets ₹ 8088 from the bank after 3 years, find the value of his monthly instalment. [4]

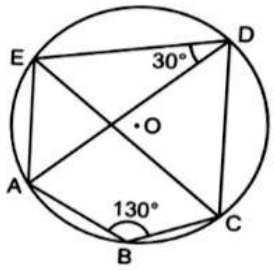
(iii) The given figure represents a solid consisting of a cylinder surmounted by a cone at one end and a hemisphere at the other. Find the volume of the solid [4]



Question 3

(i) If $x = \frac{\sqrt{a+2b}+\sqrt{a-2b}}{\sqrt{a+2b}-\sqrt{a-2b}}$, using the properties of proportion show that $bx^2 - ax + b = 0$ [4]

(ii) A, B, C, D and E are points on the circle. O is the centre, ∠ADE = 30°, ∠ABC = 130°. Calculate ∠ACE, ∠AEC and ∠EOC. [4]



(iii) Draw an ogive for the following data taking 2 cm = 10 marks on one axis and 2 cm = 10 students on the other. From your graph determine:
(a) The median.
(b) The inter-quartile range.
(c) The no. of students who scored more than 45. [5]

Marks	0–10	10–20	20–30	30–40	40–50	50–60	60–70
No. of students	6	10	15	13	20	9	7

SECTION B

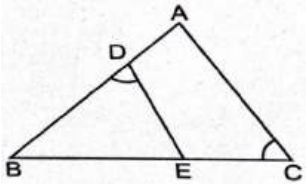
(*Attempt* ***any four*** *questions from this Section*)

Question 4

(i) If $A=\begin{bmatrix}2 & 3\\ 5 & 7\end{bmatrix}$, $B=\begin{bmatrix}0 & 4\\ -1 & 7\end{bmatrix}$ and $C=\begin{bmatrix}1 & 0\\ -1 & 4\end{bmatrix}$, find $AC+B^2-10C$. [3]

(ii) Solve the given equation and give your answer till two significant digits: $x-\frac{18}{x}=6$ [3]

(iii) In the given figure, ABC is a triangle with $\angle EDB = \angle ACB$.
Prove that $\Delta ABC \sim \Delta EBD$. If BE =6 cm, EC=4 cm, BD = 5 cm and the area of ΔBED =9 cm^2, calculate:
(a) Length of AB
(b) Area of ΔABC [4]



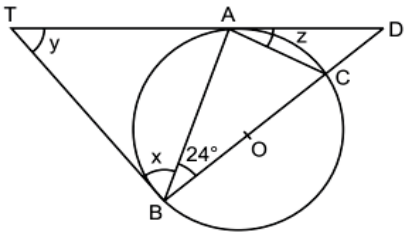
Question 5

(i) A manufacturer sells a camera for ₹10000 to a dealer. The dealer sells it a customer at a profit of 12%. If all transactions are within the state and the rate of GST is 28%, calculate
(a) the GST paid by the dealer to the State Government.
(b) the total tax received by the Central Government.
(c) the price paid by the customer. [3]

(ii) Find the mode of the following distribution by drawing a histogram. [3]

Wages in ₹	40–50	50–60	60–70	70–80	80–90	90–100
No. of workers	3	8	12	6	4	2

(iii) The tangents TA and TB are drawn to the circle with centre O. The diameter BC and tangent TA, when produced, meet at D. Given that $\angle ABC = 24°$, calculate the values of x, y and z. [4]



Question 6

(i) How many terms of the G.P. 1, 4, 16 … must be taken to have their sum equal to 341? [3]

(ii) Calculate the mean of the following distribution by short-cut method. [3]

Marks	0–10	10–20	20–30	30–40	40–50	50–60	60–70	70–80
No. of students	3	8	12	14	10	6	5	2

(iii) The surface area of a solid metallic sphere is 1256 cm^2. It is melted and recast into solid right circular cones of radius 2.5 cm and height 8 cm. Calculate:
(a) the radius of the solid sphere,
(b) the number of cones recast. (Take $\pi = 3.14$) [4]

(i) Find the equation of a line, which has the y intercept 4, and is parallel to the line $2x - 3y = 7$. Find the coordinates of the point, where it cuts the x-axis. [3]

(ii) Use the Remainder Theorem to factorise the given expression completely:
$2x^3 + x^2 - 13x + 6$ [3]

(iii) Construct a regular hexagon of side 4 cm. Construct a circle circumscribing the hexagon mention the circumradius. [4]

Question 8

(i) Solve the given inequation and graph the solution on the number line: [3]

$$-3 < -\frac{1}{2} - \frac{2x}{3} \leq \frac{5}{6}, x \in R$$

(ii) Using ruler and compasses construct
(a) ΔABC in which AB = 5.5 cm, BC =3.4 cm and CA = 4.9 cm
(b) The locus of point equidistant from A and C and draw a circle passing through A and C. [3]

(iii) Use graph paper for this question. Plot P (2, 4), Q (–2, 1) and R (5, 0). Reflect points P and Q in x-axis to get P'and Q'. Take scale as 2cm=1 unit on both the axis.
(a) Write their co-ordinates.
(b) Give a geometrical name to the figure formed by joining the points PQQ'P'R. [4]

Question 9

(i) A company with 4000 shares of nominal value of ₹110 each declares an annual dividend of 15%. Calculate: (a) The total amount of dividend paid by the company.
(b) The annual income of Virat who holds 88 shares in the company.
(c) If he received only 10% on his investment, find the price Virat paid for each share. [3]

(ii) By increasing the speed of a car by 10 km/h, the time of journey for a distance of 72 km is reduced by 36 minutes. Find the original speed of the car. [3]

(iii) Cards numbered 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that the number on the drawn card is
(a) an odd number.
(b) a perfect square number.
(c) a number divisible by 5.
(d) a prime number less than 20 [4]

Question 10

(i) Point P divides the line segment joining the points A (2, 1) and B (5, -8) such that AP: AB = 1:3. If P lies on the line 2x-y+k=0, find the value of k. [3]

(ii) The sum of 4th and 8th terms of an AP is 24 and the sum of its 6^{th} and 10^{th} terms is 44. Find the sum of first ten terms of the AP. [3]

(iii) As observed from the top of a 80 m tall light house, the angles of depression of two ships on the same side of the light house in horizontal line with its base are 30° and 40° respectively. Find the distance between the two ships. Give your answer correct to the nearest metre. [4]
(Use mathematical tables for this question)

KISA PREPARATORY EXAM
2023-2024

CLASS: X SUB: MATHEMATICS MARKS: 80.

Question 1 (15 marks)

(i) d) 6

(ii) c) 3

(iii) c) $\frac{-2}{3}$

(iv) b) cosA

v) b) 25

vi) a) 30°

vii) c) 2:5

viii) c) ₹800

ix) b) 20:27

x) d) ₹5400

xi) d) both of (a) and (b)

xii) c) 11:3

xiii) a) {0,1,2,3}

xiv) b) (1,1)

xv) d) (A) is false but (R) is true

Question 2

i) To prove $\frac{\text{cosec}\theta}{(\text{cosec}\theta-1)} + \frac{\text{cosec}\theta}{(\text{cosec}\theta+1)} = 2\sec^2\theta$

LHS: $\frac{\text{cosec}\theta}{(\text{cosec}\theta-1)} + \frac{\text{cosec}\theta}{(\text{cosec}\theta+1)}$

$= \frac{\text{cosec}\theta(\text{cosec}\theta+1) + \text{cosec}\theta(\text{cosec}\theta-1)}{(\text{cosec}\theta-1)(\text{cosec}\theta+1)}$ (1)

$= \frac{\text{cosec}^2\theta + \text{cosec}\theta + \text{cosec}^2\theta - \text{cosec}\theta}{\text{cosec}^2\theta - 1}$

$= \frac{2\ \text{cosec}^2\theta}{\cot^2\theta}$ (1) $[\because \text{cosec}^2\theta - \cot^2\theta = 1]$

$= 2 \times \frac{1}{\sin^2\theta} \times \frac{\sin^2\theta}{\cos^2\theta}$

$= \frac{2}{\cos^2\theta}$ (1)

$= 2\sec^2\theta$ (1)

ii) MV = ₹8088, n = 3 years, r = 8 + p%

= 36 months

$MV = P \times n + \frac{P \times n \times (n+1)}{2 \times 12} \times \frac{r}{100}$ } (1)

$8088 = 36P + \frac{P \times 36 \times 37}{2 \times 12} \times \frac{8}{100}$

$8088 = 36P + \frac{111P}{25}$ (1)

$8088 = \frac{1011P}{25}$ (1)

$\therefore P = \frac{8088 \times 25}{1011}$

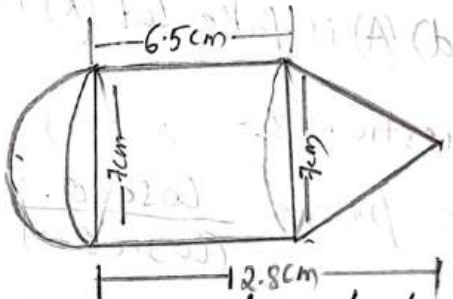
$P = ₹200$ (1)

Monthly installment = ₹200

iii) For cone: $r = 3.5\text{cm}$, $h_1 = 6.3\text{cm}$

For cylinder: $r = 3.5\text{cm}$, $h_2 = 6.5\text{cm}$

For hemisphere: $r = 3.5\text{cm}$



Total Volume of solid = Vol. of cone + Vol. of cylinder + Vol. hemisphere

$= \frac{1}{3}\pi r^2 h_1 + \pi r^2 h_2 + \frac{2}{3}\pi r^3$

$= \pi r^2 \left(\frac{1}{3} \times h_1 + h_2 + \frac{2}{3} \times r\right)$

$= \frac{22}{7} \times 3.5 \times 3.5 \left(\frac{1}{3} \times 6.3 + 6.5 + \frac{2}{3} \times 3.5\right)$ } (1)

$= 38.5 \left(2.1 + 6.5 + \frac{7}{3}\right)$ (1)

$$= 38.5\left(\frac{6.3+19.5+7}{3}\right)$$

$$= 38.5 \times \frac{32.8}{3} \quad (1)$$

$$= \frac{1262.8}{3}$$

$$= 420.93 \text{ cm}^3 \quad (1)$$

Question 3

(i) $\frac{x}{1} = \frac{\sqrt{a+2b}+\sqrt{a-2b}}{\sqrt{a+2b}-\sqrt{a-2b}}$

Applying componendo and dividendo

$$\frac{x+1}{x-1} = \frac{\sqrt{a+2b}+\sqrt{a-2b}+\sqrt{a+2b}-\sqrt{a-2b}}{\sqrt{a+2b}+\sqrt{a-2b}-\sqrt{a+2b}+\sqrt{a-2b}}$$

$$\frac{x+1}{x-1} = \frac{2\sqrt{a+2b}}{2\sqrt{a-2b}} \quad (1)$$

$$\frac{x+1}{x-1} = \frac{\sqrt{a+2b}}{\sqrt{a-2b}}$$

Squaring on both side

$$\frac{x^2+2x+1}{x^2-2x+1} = \frac{a+2b}{a-2b} \quad (1)$$

Applying componendo and dividendo

$$\frac{x^2+2x+1+x^2-2x+1}{x^2+2x+1-x^2+2x-1} = \frac{a+2b+a-2b}{a+2b-a+2b}$$

$$\frac{2(x^2+1)}{4x} = \frac{2a}{4b} \quad (1)$$

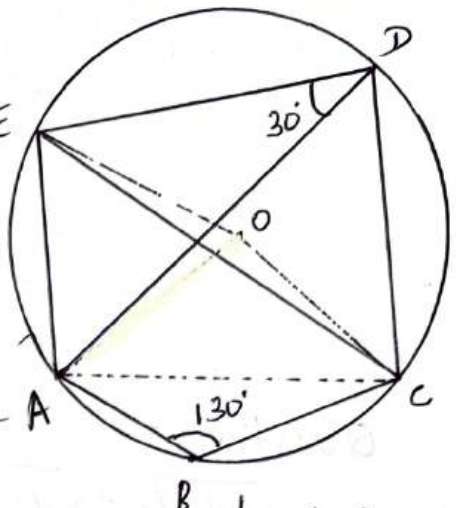
$$\frac{x^2+1}{x} = \frac{a}{b}$$

$$b(x^2+1) = ax$$

$$bx^2+b-ax=0 \quad (1)$$

ii) $\angle ACE = \angle ADE$ (Angles in the same segment of a circle are equal)

$\therefore \angle ACE = 30^\circ$



Next,

ABCD is a cyclic quadrilateral

$\therefore \angle ABC + \angle ADC = 180^\circ$ (Opposite angles of a cyclic quadrilateral are supplementary)

$130^\circ + \angle ADC = 180^\circ$

$\angle ADC = 50^\circ$ (1)

Now, $\angle AEC = \angle ADC$ (Angles in the same segment of a circle are equal)

$\therefore \angle AEC = 50^\circ$

Next, $\angle EDC = \angle ADE + \angle ADC$

$= 30^\circ + 50^\circ$

$= 80^\circ$ (1)

and $\angle EOC = 2\angle EDC$ (Angle subtended at the centre of a circle is twice the angle subtended in the same segment)

$= 2 \times 80^\circ$

$\therefore \angle EOC = 160^\circ$ (1)

[NOTE: Reason for atleast one step should be given or else ans -1 (1)]

(iii)

Marks	No. of students	Cf
0-10	6	6
10-20	10	16
20-30	15	31
30-40	13	44
40-50	20	64
50-60	9	73
60-70	7	80

$N = 80$,

(i) Median = $\left(\frac{N}{2}\right)^{th}$ score = 40^{th} score

$\therefore$ Median = 36.5 marks (1)

(ii) Lower quartile = $Q_1 = \left(\frac{80}{4}\right)^{th}$ score = 20^{th} score

$\therefore Q_1 = 23$

Upper quartile (1): $Q_3 = \left(\frac{3 \times 80}{4}\right)^{th}$ score = 60^{th} score

$Q_3 = 48.5$

Inter quartile range $Q_3 - Q_1 = 48.5 - 23$

$= 25.5$ (1)

(iii) No. of students who scored more than 45 marks = 29 (1)

Smooth curve with correct scale: (1)

Section - B

Question 4

(i) $AC = \begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}\begin{bmatrix} 1 & 0 \\ -1 & 4 \end{bmatrix} = \begin{bmatrix} 2-3 & 0+12 \\ 5-7 & 0+28 \end{bmatrix} = \begin{bmatrix} -1 & 12 \\ -2 & 28 \end{bmatrix}$ (1)

$B^2 = \begin{bmatrix} 0 & 4 \\ -1 & 7 \end{bmatrix}\begin{bmatrix} 0 & 4 \\ -1 & 7 \end{bmatrix} = \begin{bmatrix} 0-4 & 0+28 \\ 0-7 & -4+49 \end{bmatrix} = \begin{bmatrix} -4 & 28 \\ -7 & 45 \end{bmatrix}$ (1)

$10C = 10\begin{bmatrix} 1 & 0 \\ -1 & 4 \end{bmatrix} = \begin{bmatrix} 10 & 0 \\ -10 & 40 \end{bmatrix}$

$AC + B^2 - 10C = \begin{bmatrix} -1 & 12 \\ -2 & 28 \end{bmatrix} + \begin{bmatrix} -4 & 28 \\ -7 & 45 \end{bmatrix} - \begin{bmatrix} 10 & 0 \\ -10 & 40 \end{bmatrix}$

$= \begin{bmatrix} -15 & 40 \\ 1 & 33 \end{bmatrix}$ (1)

(ii) $x - \frac{18}{x} = 6$

$x^2 - 18 = 6x$

$x^2 - 6x - 18 = 0$

$a = 1,\ b = -6,\ c = -18$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$= \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-18)}}{2(1)}$ (1)

$= \frac{6 \pm \sqrt{36 + 72}}{2}$

$= \frac{6 \pm \sqrt{108}}{2}$

$= \frac{6 \pm \sqrt{36 \times 3}}{2}$

$= \frac{6 \pm 6\sqrt{3}}{2}$

$= \frac{6(1 \pm \sqrt{3})}{2}$

$= 3 \pm 3\sqrt{3}$

$\therefore x = 3 + \sqrt{3}$

$= 3 + 1.732 \times 3$ (1)

$= 8.196$

$\therefore x = 8.2$

$x = 3 - \sqrt{3}$

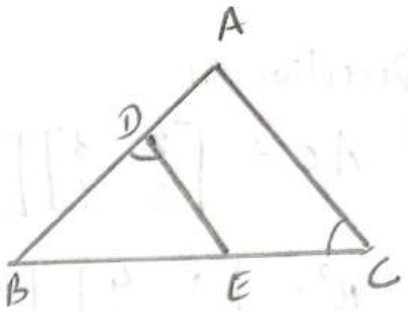
$x = 3 - 1.732 \times 3$

$= -2.196$

$x = -2.2$

(both should be correct)

(iii) Given: $\angle EDB = \angle ACB$, $BE = 6cm$
$EC = 4cm$, $BD = 5cm$,
Area of $\Delta BED = 9 cm^2$



Solution: ΔABC ΔEBD

$\angle A = \angle A$ (Common)

$\angle ACB = \angle EDB$ (given)

$\therefore \Delta ABC \sim \Delta EBD$ (by AA Similarity) (1)

$\therefore \frac{AB}{EB} = \frac{BC}{BD} = \frac{AC}{ED}$ (Corresponding parts of similar triangles are proportional)

(i) Consider $\frac{AB}{EB} = \frac{BC}{BD}$

$\frac{AB}{6} = \frac{10}{5}$

$\therefore AB = 12cm$ (1)

(ii) $\frac{Ar.\ \Delta ABC}{Ar.\ \Delta EBD} = \frac{AB^2}{EB^2} = \frac{12^2}{6^2} = \frac{4}{1}$ (1)

$\therefore Ar.\ \Delta ABC = 4 \times 9$
$= 36 cm^2$ (1)

[Ratio of areas of two similar triangles is equal to ratio of their corresponding sides]

Question 5

(i) For manufacturer,

$CGST = SGST = \frac{14}{100} \times 10000 = ₹1400$

For dealer sells it to a customer at a profit of 12%.

$SP = 10,000 + \frac{12}{100} \times 10,000 = ₹11,200$

$CGST = SGST = \frac{14}{100} \times 11,200 = ₹1568$

(i) GST paid by dealer to state govt $= 1568 - 1400 = ₹168$ (1)

(ii) Total tax received by Central govt $= ₹1400 + (1568 - 1400)$
$= ₹1568$ (1)

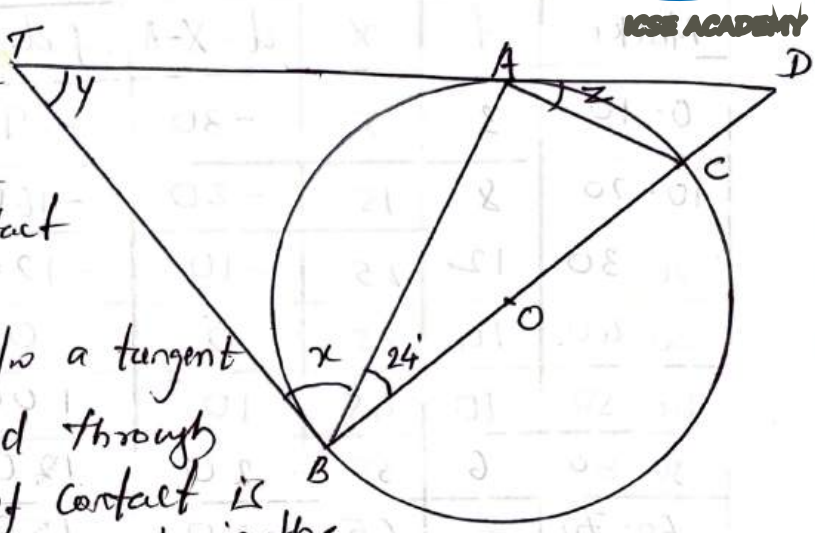
(iii) The price paid by customer $= ₹11200 + 1568 + 1568$
$= ₹ 14,336$ (1)

(ii) Mode: 65 or 64

(iii) $\angle OBT = 90°$ (Angle b/w the tangent and radii at the point of contact is 90°)

$x + 24° = 90°$

$\boxed{x = 66°}$ (1)



Next

$\angle CAD = \angle ABC$ (The angle b/w a tangent and a chord through a point of contact is equal to an angle in the alternate segment are equal)

$\therefore \boxed{z = 24°}$ (1)

Next

$AT = BT$ ⟶ (Tangent drawn to a circle from an external point are equal in length)

$\Rightarrow \Delta ATB$ is isosceles

$\therefore \angle ATB = 180° - (x + x)$

$= 180° - (66° + 66°)$

$\boxed{y = 48°}$ (1)

(NOTE: Atleast one reason to be given or else ow -1)

Question 6

(i) For GP 1, 4, 16 ....

$a = 1, \quad r = \frac{4}{1} = 4, \quad |r| = |4| = 4 > 1$

$\therefore S_n = \frac{a(r^n - 1)}{r - 1} = \frac{1(4^n - 1)}{4 - 1} = 341$ (1)

$4^n - 1 = 341 \times 3$ (1)

$4^n = 1024$

$2^{2n} = 2^{10}$

$\therefore 2n = 10$

$n = 5$ (1)

$\therefore$ 5 terms to be taken to sum up to 341

(ii) Mean by Short cut Method

Marks	f	x	d = X-A	fd
0-10	3	5	-30	-90
10-20	8	15	-20	-160
20-30	12	25	-10	-120
30-40	14	35	0	0
40-50	10	45	10	100
50-60	6	55	20	120
60-70	5	65	30	150
70-80	2	75	40	80
	N=60			

Let A = 35 $\quad \Sigma fd = 80$

$$\text{Mean} = A + \frac{\Sigma fd}{N}$$
$$= 35 + \frac{80}{60} \quad (1)$$
$$= 35 + \frac{4}{3}$$
$$= \frac{109}{3}$$
$$= 36.33 \quad (1)$$

[Either 4 class marks or 4 deviation are corret – (1)]

(iii) (i) Surface Area of metallic sphere = 1256 cm^2

$$4\pi r^2 = 1256$$
$$4 \times 3.14 \times r^2 = 1256 \quad (1)$$
$$r = 10 cm \quad (1)$$

(ii) $n \times$ Vol of Cone = Vol. of Sphere

$$n \times \frac{1}{3}\pi r_1^2 h = \frac{4}{3}\pi r_2^3 \quad (1)$$
$$n \times (2.5)^2 \times h = 4 r_2^3$$
$$2.5 \times 2.5 \times n \times 8 = 4 \times 10 \times 10 \times 10$$
$$n = 80 \quad (1)$$

Question 7

(i) For given line, $2x - 3y = 7$

$$y = \frac{2}{3}x - \frac{7}{3}$$

Slope $(m_1) = \frac{2}{3}$

∴ Since req. line parall to given line

∴ slope of req. line = $\frac{2}{3}$ (1)

and y intercept = 4

∴ Equation of line in slope intercept form,

$y = mx + c$

$y = \frac{2}{3}x + 4$

$\therefore 2x - 3y + 12 = 0$ (1)

This line cuts the x axis at $y = 0$

$\therefore 2x - 3(0) + 12 = 0$

$x = -6$

∴ The given line cuts the x axis at point $(-6, 0)$ (1)

(ii) $f(x) = 2x^3 + x^2 - 13x + 6$

factors of 6 = $\pm 1, \pm 2, \pm 3, \pm 6$

$f(2) = 2(2)^3 + 2^2 - 13(2) + 6$

$f(2) = 0$

$\therefore x = 2$

$x - 2 = 0$

$\therefore (x-2)$ is a factor of $f(x)$ (1) [∵ by factor theorem]

$x-2)\overline{2x^3 + x^2 - 13x + 6}\,(2x^2 + 5x - 3$ (1)

$-2x^3 \pm 4x^2$

$5x^2 - 13x$

$-5x^2 \pm 10x$

$-3x + 6$

$-3x + 6$

0

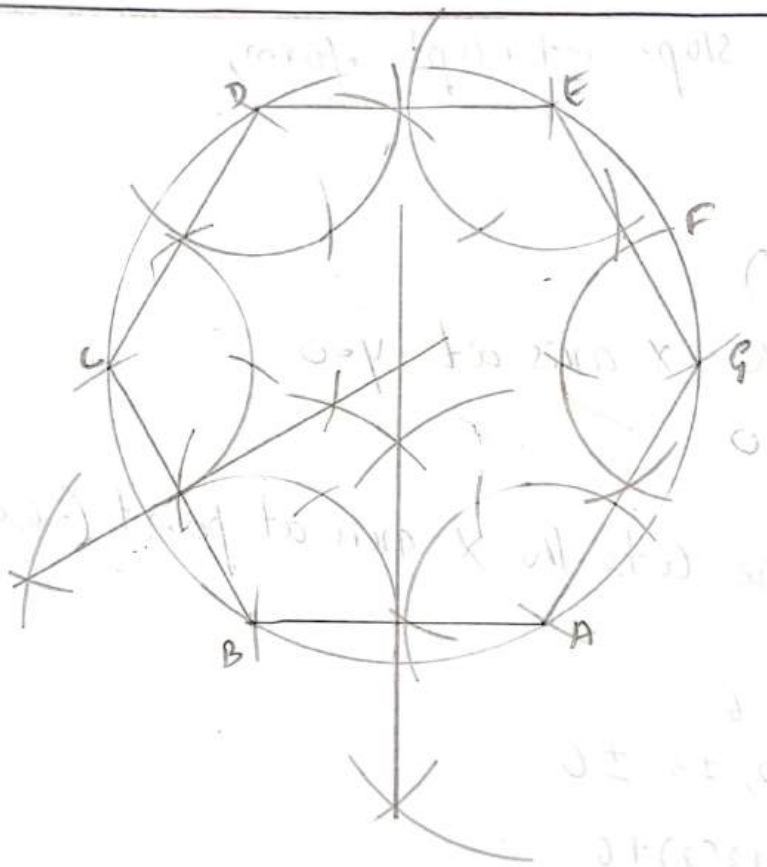
$f(x) = (x-2)(2x^2 + 5x - 3)$

$= (x-2)(2x^2 + 6x - x - 3)$

$= (x-2)[2x(x+3) - 1(x+3)]$

$f(x) = (x-2)(x+3)(2x-1)$ (1)

(iii)



Circum radius = 4cm

Question 8

i) $-3 < -\frac{1}{2} - \frac{2x}{3} \leq \frac{5}{6}$, $x \in R$

$-3 < -\frac{1}{2} - \frac{2x}{3}$ and $-\frac{1}{2} - \frac{2x}{3} \leq \frac{5}{6}$

$-3 + \frac{1}{2} < -\frac{2x}{3}$ $\quad -\frac{2x}{3} \leq \frac{5}{6} + \frac{1}{2}$

$-\frac{5}{2} < -\frac{2x}{3}$ or $-\frac{2x}{3} \leq \frac{8}{6_2}$ (1)

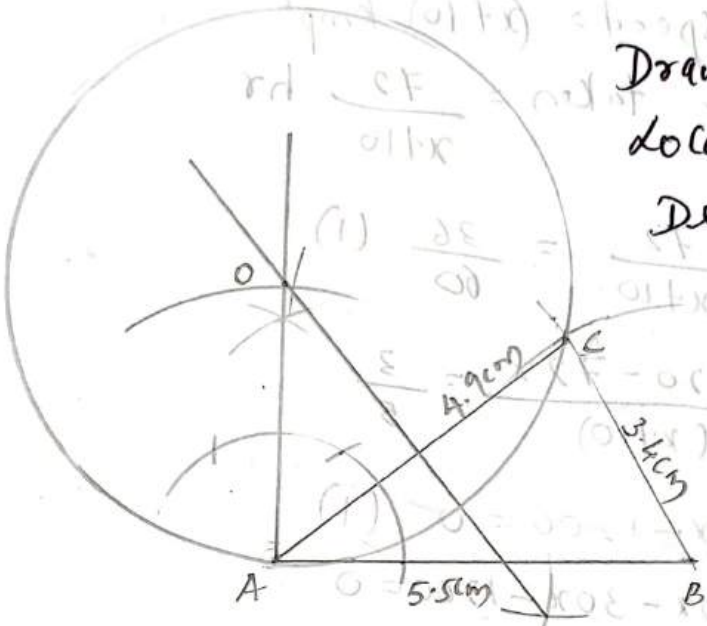
$x < \frac{15}{4}$ $\quad x \geq -2$

$-2 \leq x < 3\frac{3}{4}$

Sol. set = $\{x : x \in R, -2 \leq x < 3\frac{3}{4}\}$ (1)

(1)

ii)



Drawing Δ = (1)
Locating point O = (1)
Draw circle correctly touching AC = (1)

iii) a) $M_x P(2,4) = P' = (2,-4)$
$M_x Q(-2,1) = Q' = (-2,-1)$ } (1)

b) Geometrical name of PQQ'P'R is Pentagon or 5 sided polygon (1)

plotting P, R and Q (1)
plotting P' and Q' (1)

Question 9

i) a) Total dividend paid by Company = $\frac{\text{Dividend \%} \times \text{No. of shares} \times \text{NV}}{100}$

$= \frac{15 \times 4000 \times 110}{100}$

$= ₹66,000$ (1)

b) Annual income of Virat = $₹\frac{15}{100} \times 110 \times 88 = ₹1452$ (1)

c) NV x Dividend % = MV x Return %
$110 \times 15 = MV \times 10$
$\therefore MV = ₹165$ (1)

ii) Let the original speed of the car = x kmph

original time taken = $\frac{72}{x+10}$ hr

Increased speed = (x+10) kmph

New time taken = $\frac{72}{x+10}$ hr

$\therefore \frac{72}{x} - \frac{72}{x+10} = \frac{36}{60}$ (1)

$\frac{72x+720-72x}{x(x+10)} = \frac{3}{5}$

$x^2+10x-1200=0$ (1)

$x^2+40x-30x-1200=0$

$(x-30)(x+40)=0$

$x=30$, $x=-40$ Ignored

$\therefore$ original speed of car = 30 kmph (1)

iii) Total no. of cards = 60-10 = 50

$S = \{11, 12, 13, 14, \ldots\ldots 60\}$, $n(S)=50$

a) odd no = $\{11, 13, 15, \ldots\ldots 59\} = E_1$

$n(E_1) = 25$

$\therefore$ P(number of odd no. cards) = $\frac{\text{No. favourable outcomes}}{\text{Total no. of outcomes}}$

$= \frac{25}{50}$

$= \frac{1}{2}$

b) a perfect square no = $\{16, 25, 36, 49\}$

$n(E_2) = 4$

P(a perfect square card) = $\frac{\text{No. of favourable outcomes}}{\text{Total. no. of outcomes}}$

$= \frac{4}{50} = \frac{2}{25}$

c) A no. divisible by 5 = {5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60}

$n(E_3) = 10$

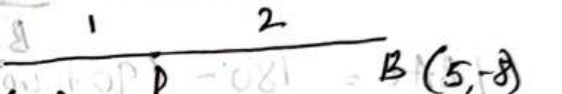
$P(\text{number divisible by 5}) = \frac{\text{No. of favourable outcomes}}{\text{Total no. of outcomes.}}$

$= \frac{10}{50}$

$= \frac{1}{5}$

Question 10

i) AP: PB = 1:2



By section formula, the coordinates of the point P which divides the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$ in the ratio $m_1 : m_2$ is given by

$P(x, y) = \left(\frac{m_1x_2 + m_2x_1}{m_1+m_2}, \frac{m_1y_2 + m_2y_1}{m_1+m_2}\right)$ } (1)

$= \left(\frac{(1)(5)+(2)(2)}{1+2}, \frac{(1)(-8)+(2)(1)}{1+2}\right)$

$= (3, -2)$ (1)

Since the point P lies on the line $2x - y + k = 0$

$\Rightarrow 2(3) - (-2) + k = 0$

$k = -8$ (1)

(ii) $t_4 + t_8 = 24$

$a + 3d + a + 7d = 24$

$2a + 10d = 24$

$a + 5d = 12$ — (1)

$t_6 + t_{10} = 44$

$a + 5d + a + 9d = 44$

$2a + 14d = 44$

$a + 7d = 22$ — (2) } Either of them is correct (1)

Now, on solving (1) & (2)

$d = 5, \quad a = -13$ } (1) (if both are correct)

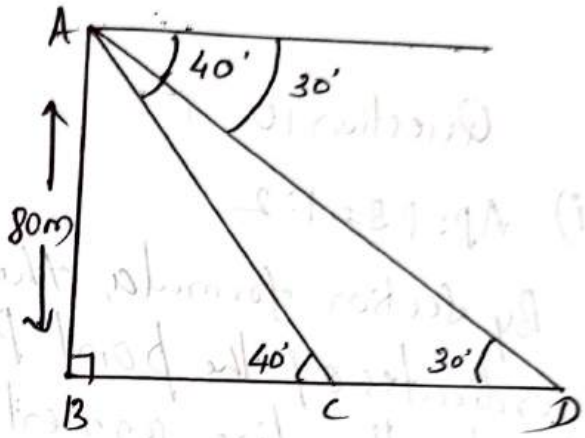
Now, $S_n = \frac{n}{2}[2a + (n-1)d]$

$S_{10} = \frac{10}{2}[2 \times (-13) + (10-1)(5)]$

$= 5[-26 + 45]$

$S_{10} = 95$ (1)

iii) Let AB be light house and C and D be two ships



In ΔABC,

$\angle BAC = 180° - (90 + 40)$

$= 50°$

$\tan 50° = \frac{BC}{AB}$

$1.1918 = \frac{BC}{80}$ (1) [Either for finding tan40°]

$BC = 95.344$ m (1)

[This question can also be solved by taking tan40°]

In ΔABD,

$\angle BAD = 180° - (90 + 30)$

$= 60°$

$\tan 60° = \frac{BD}{AB}$

$1.7321 = \frac{BD}{80}$

$\therefore BD = 138.568$ m (1)

$\therefore CD = BD - BC$

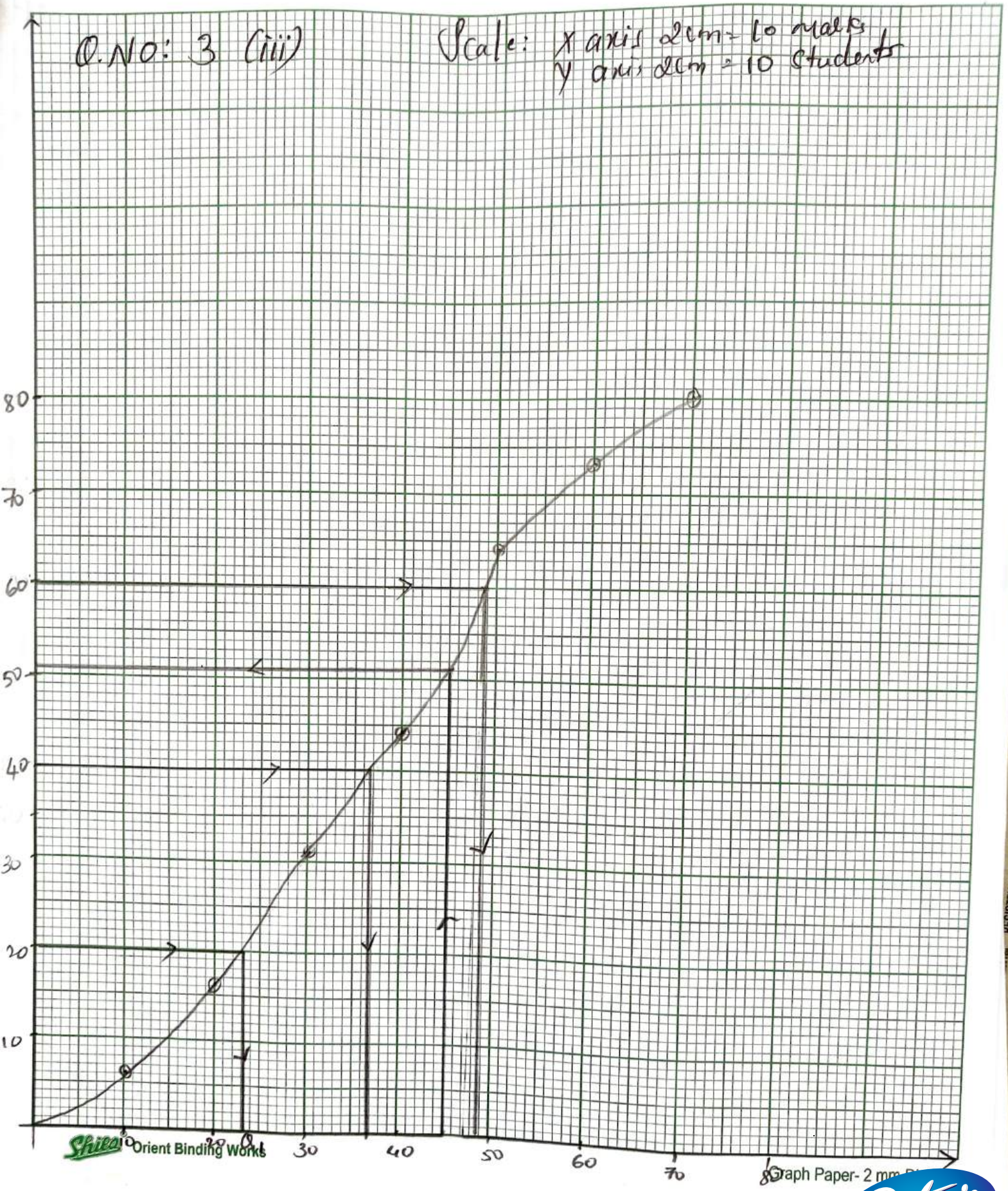
$= 138.568 - 95.344$

$= 43.224$

$= 43$ m (1)

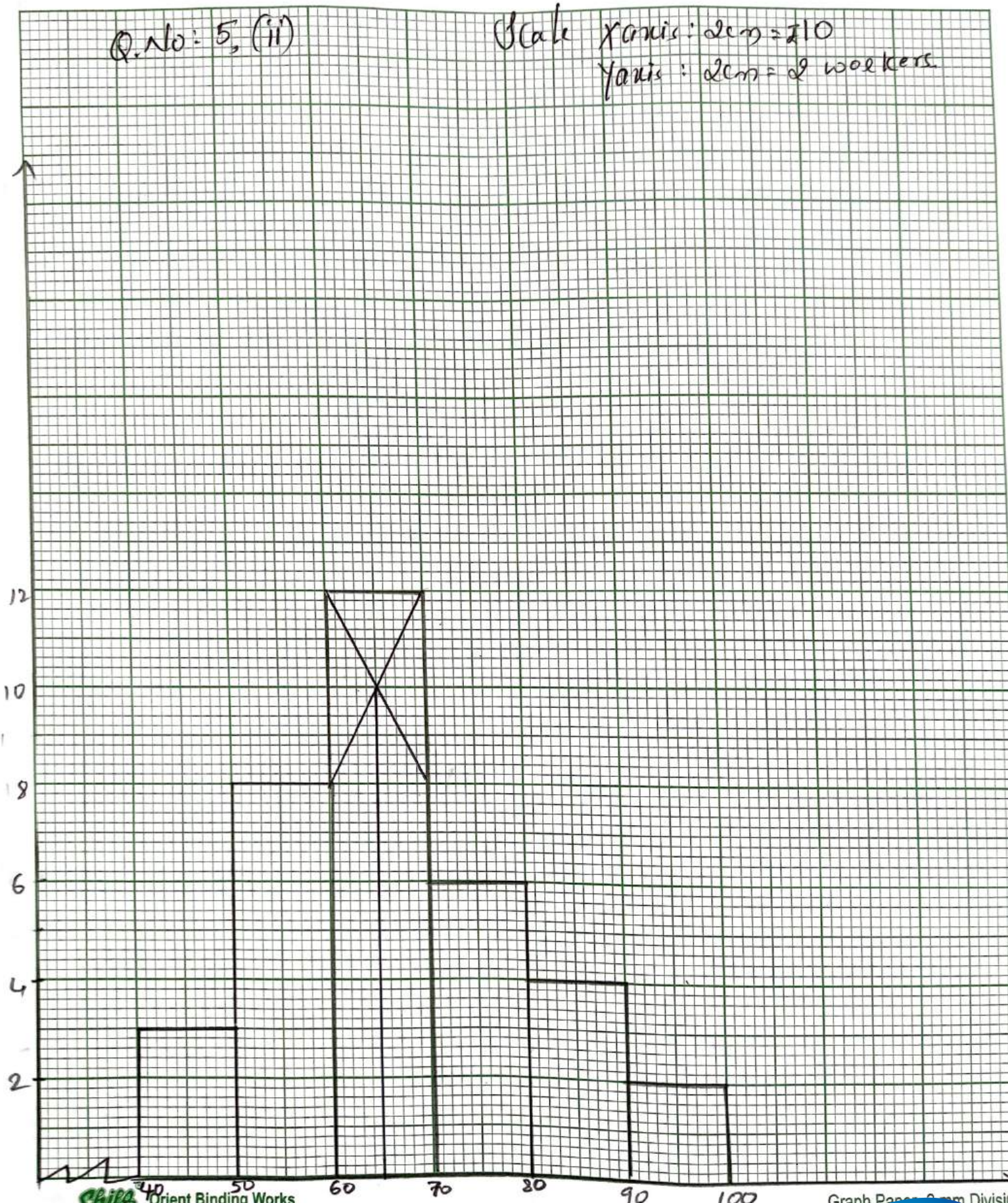
Q.NO: 3 (iii)

Scale: x axis 2cm = 10 marks
y axis 2cm = 10 students



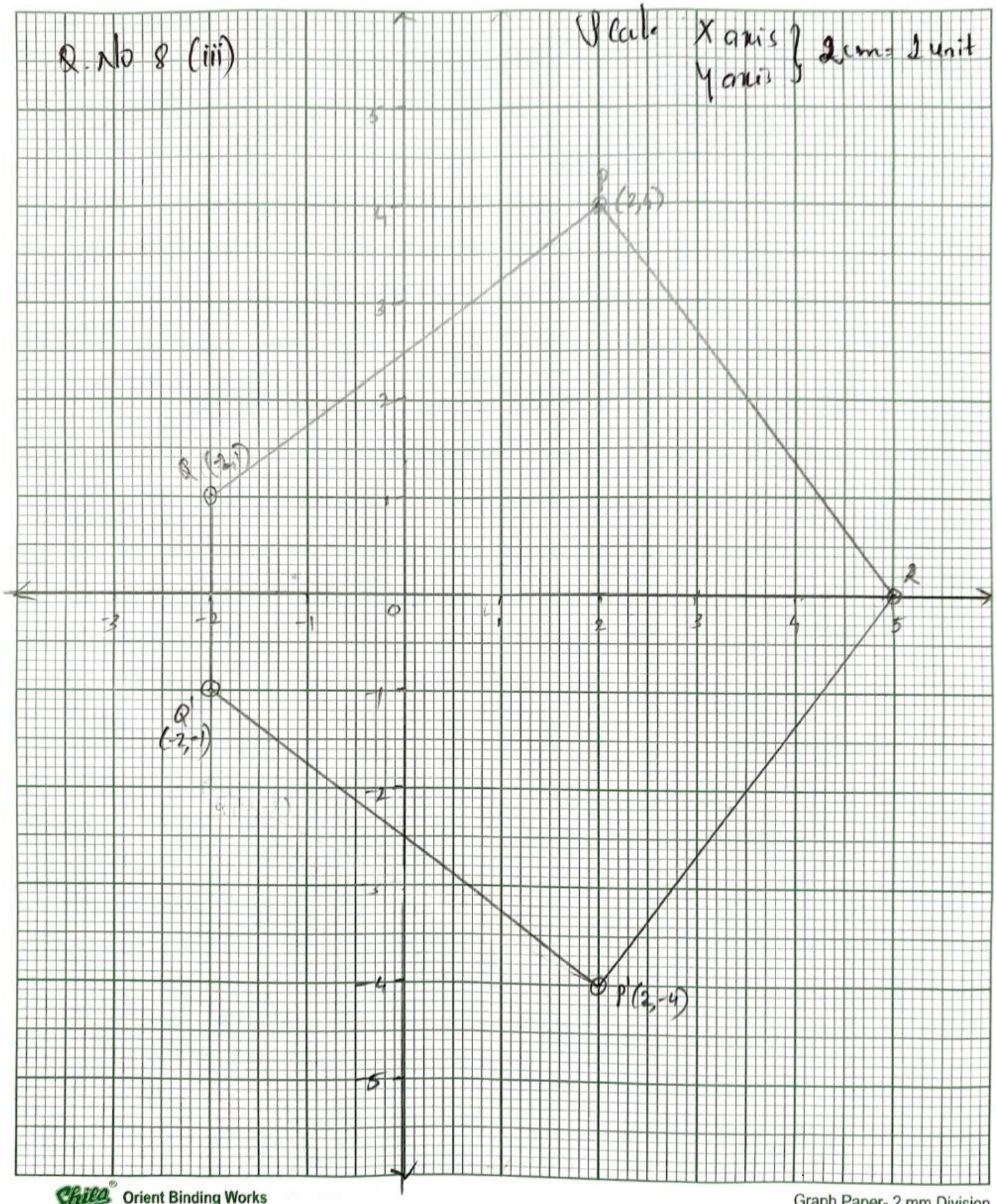
Q. No: 5, (ii)

Scale x axis: 2cm = ₹10
y axis: 2cm = 2 workers.



Q. No 8 (iii)

Scale: X axis } 2 cm = 1 unit
Y axis }

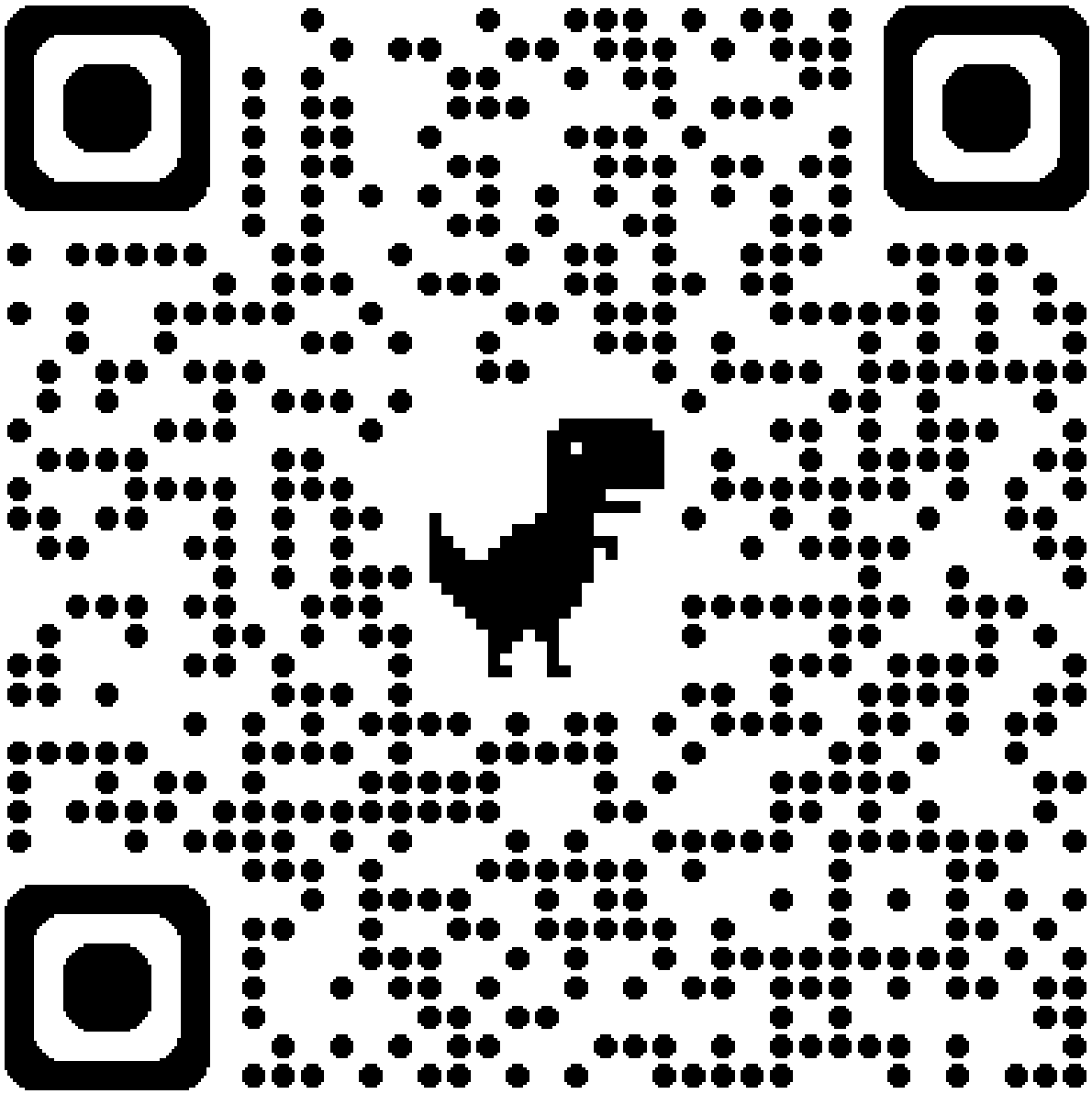


Pati's ICSE ACADEMY

Prepare for ICSE CLASS 10 Mathematics

Free Resources

SCAN QR CODE Now



Pati's

ICSE ACADEMY

Scan QR code for Free Access to
500+ Prelim Papers across 20 subjects