Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
SECONDARY SCHOOL SUPPLEMENTARY EXAMINATION, 2025
SUBJECT NAME : MATHEMATICS (BASIC) (SUB. CODE-241)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	**"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, evaluation done and several other aspects. It's leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc. may invite action under various rules of the Board and IPC."**
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them.**
4	The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark (✓) wherever answer is correct. For wrong answer CROSS 'X" be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks _____(example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.

13	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- ● Leaving answer or part thereof unassessed in an answer book. ● Giving more marks for an answer than assigned to it. ● Wrong totaling of marks awarded on an answer.
	● Wrong transfer of marks from the inside pages of the answer book to the title page. ● Wrong question wise totaling on the title page. ● Wrong totaling of marks of the two columns on the title page. ● Wrong grand total. ● Marks in words and figures not tallying/not same. ● Wrong transfer of marks from the answer book to online award list. ● Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) ● Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for spot Evaluation**" before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

Set 430/S/1

MARKING SCHEME MATHEMATICS (BASIC)

SECTION A

*This section comprises **20** Multiple Choice Questions (MCQs) carrying **1** mark each.* *20×1=20*

1. If the first term of an A.P. is 'a' and its common difference is 'b', then its 10^{th} term is :

(A) a + 10b (B) 10a + b

(C) a + 9b (D) 9a + b

Ans: (C) a + 9b — 1

2. If the point $(3, \frac{3}{4})$ is the mid-point of the line segment joining the points (k, 0) and $(7, \frac{3}{2})$, then the value of 'k' is :

(A) – 1 (B) 1

(C) $\frac{3}{2}$ (D) 5

Ans: (A) - 1 — 1

3. The area of a sector of a circle with radius 7 cm, when the angle of the sector is 60°, is :

(A) $\frac{22}{3}$ sq cm (B) $\frac{77}{3}$ sq cm

(C) $\frac{44}{7}$ sq cm (D) $\frac{132}{7}$ sq cm

Ans: (B) $\frac{77}{3}$ sq. cm. — 1

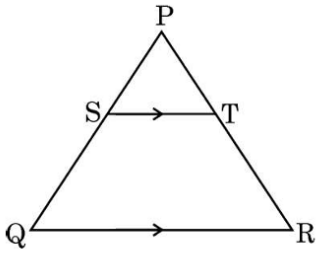
4. Two different coins are tossed together. The probability of getting exactly one tail is :

(A) $\frac{1}{4}$ (B) $\frac{1}{2}$

(C) $\frac{3}{4}$ (D) 1

Ans: (B) $\frac{1}{2}$	1

5. In the given figure, in Δ PQR, ST || QR. If PS = 16 mm and PQ = 40 mm, then PT : TR is :



(A) 2 : 3 (B) 3 : 2
(C) 2 : 5 (D) 5 : 2

Ans: (A) 2 : 3	1

6. Which of the following is an ***incorrect*** statement ?

(A) Two congruent triangles are also similar.
(B) A square and a rhombus are not similar.
(C) Two triangles are similar if their corresponding sides are proportional.
(D) Two polygons are similar if and only if their corresponding sides are in proportion.

Ans: (D) Two polygons are similar if and only if their corresponding sides are in proportion	1

7. The value of $\frac{1 - \tan^2 45°}{1 + \tan^2 45°}$ is equal to the value of :

(A) tan 30° (B) tan 60°
(C) tan 90° (D) tan 0°

Ans: (D) tan 0°	1

8. The empirical relationship between the three measures of central tendency is :

(A) 3 Median = Mode + 2 Mean
(B) 3 Median = Mode – 2 Mean
(C) 3 Mode = Median + 2 Mean
(D) 3 Mean = Mode – 2 Median

Ans: (A) 3 Median = Mode + 2 Mean	1

9. A fair die is thrown once. The probability of getting an even number less than 3 is :

(A) $\frac{1}{6}$ (B) $\frac{1}{3}$

(C) $\frac{1}{2}$ (D) 0

Ans: (A) $\frac{1}{6}$ — 1

10. The probability of the happening of an event is 'p' and the probability of non-happening of the same event is 'q'. The relation between 'p' and 'q' is :

(A) $p + q + 1 = 0$ (B) $p = q - 1$

(C) $p + q = 1$ (D) $p = 1, q = 1$

Ans: (C) $p + q = 1$ — 1

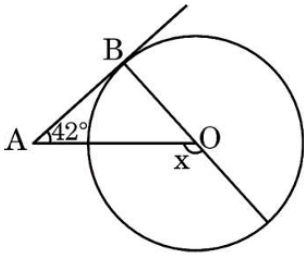
11. If α and β are the zeroes of the polynomial $p(x) = 2x^2 + 6x - 6$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is equal to :

(A) – 1 (B) 1

(C) – 3 (D) 3

Ans: (B) 1 — 1

12. In the given figure, AB is a tangent to the circle with centre O. If $\angle BAO = 42°$, then the value of x is :



(A) 42° (B) 38°

(C) 48° (D) 132°

Ans: (D) 132° — 1

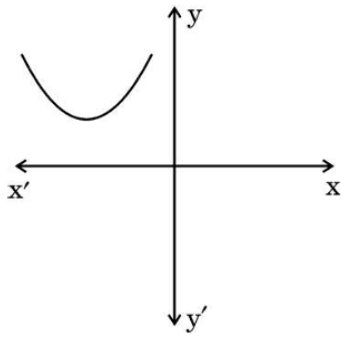
13. The distance between two parallel tangents to a circle of radius 3·5 cm is :

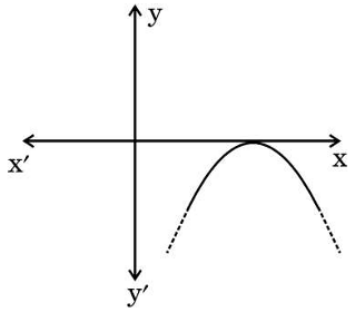
(A) 3·5 cm (B) 14 cm

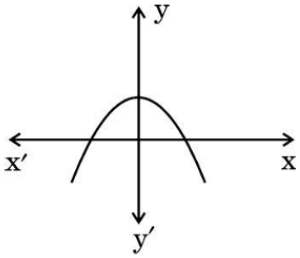
(C) 1·75 cm (D) 7 cm

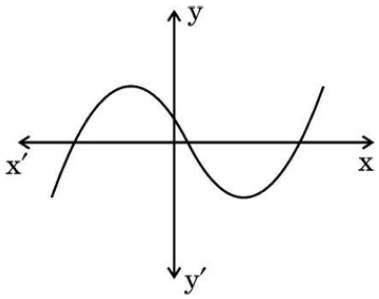
Ans: (D) 7 cm — 1

14. Which of the following is ***not*** the graph of a quadratic polynomial ?

(A) 

(B) 

(C) 

(D) 

Ans: (D)	1

15. If the quadratic equation $ax^2 + ax + c = 0$ $(a \neq 0)$ has real and equal roots, then :

(A) $a = 4c$ (B) $4a = c$

(C) $a = -4c$ (D) $c = -4a$

Ans: (A) $a = 4c$	1

16. The next term of the A.P. $\sqrt{5}$, $\sqrt{20}$, $\sqrt{45}$, ... is :

(A) $\sqrt{60}$ (B) $4\sqrt{5}$

(C) $\sqrt{75}$ (D) $\sqrt{125}$

Ans: (B) $4\sqrt{5}$	1

17. The solution of the pair of linear equations $3x + 4y = 5$; $4x + 3y = 9$ is :

(A) $x = -3, y = 1$

(B) $x = 3, y = 1$

(C) $x = 3, y = -1$

(D) $x = -3, y = -1$

Ans: (C) $x = 3, y = -1$	1

18. If $x \tan 45° \cos 60° = \sqrt{3} \sin 60° \cot 60°$, then the value of x is :

(A) 1

(B) $\frac{1}{\sqrt{3}}$

(C) $\sqrt{3}$

(D) $\frac{\sqrt{3}}{2}$

Ans: (C) $\sqrt{3}$ | 1

*Questions number **19** and **20** are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.*

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

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

19. *Assertion (A) :* Area of a sector of a circle with radius r and angle with degree measure θ is $\frac{\theta}{360} \times 2\pi r$.

Reason (R) : Area of segment of a circle = Area of the corresponding sector – Area of the corresponding triangle.

Ans: (D) Assertion (A) is false, but Reason (R) is true. | 1

20. *Assertion (A) :* If two triangles are equiangular, then they are similar.

Reason (R) : If two triangles are similar, then they are congruent.

Ans: (C) Assertion (A) is true, but Reason (R) is false. | 1

SECTION B

*This section comprises **5** Very Short Answer (VSA) type questions carrying **2** marks each.* *5×2=10*

21. In a school, there are two Sections A and B of Class X. There are 48 students in Section A and 36 students in Section B. Determine the minimum number of books required for their class library so that they can be distributed equally among the students of Section A or that of Section B.

Solution: $48 = 2 \times 2 \times 2 \times 2 \times 3$ ½

$36 = 2 \times 2 \times 3 \times 3$ ½

LCM of (48, 36) $= 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 144$ **1**

Minimum number of books required for their class library so that they can be distributed equally among the students of Section A or that of Section B are144

22. (a) Find the zeroes of the polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$.

OR

(b) Find a quadratic polynomial in x, whose one zero is 15 and sum of the zeroes is 42.

Solution: (a) Let $p(y) = 7y^2 - \frac{11}{3}y - \frac{2}{3}$

$= \frac{1}{3}[21y^2 - 11y - 2]$

$= \frac{1}{3}(3y - 2)(7y + 1)$ **1**

$\Rightarrow y = \frac{2}{3}, \frac{-1}{7}$ ½ + ½

$\therefore$ Zeroes of the polynomial are $\frac{2}{3}, \frac{-1}{7}$

OR

(b) Other zero = 42 – 15 = 27 ½

Product of zeroes = (15) (27) = 405 ½

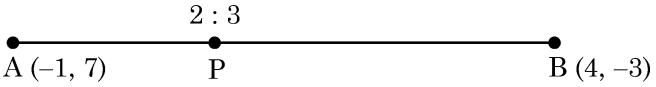
$\therefore$ Quadratic polynomial is $f(x) = x^2 - 42x + 405$	**1**

23. (a) Find the coordinates of the point which divides the join of $(-1, 7)$ and $(4, -3)$ in the ratio 2 : 3.

OR

(b) Using distance formula, prove that the points A(3, 1), B(6, 4) and C(8, 6) are collinear.

Solution: (a)



Let P (x, y) divides AB in the ratio 2: 3 internally

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

$$y = \frac{2(-3) + 3(7)}{2 + 3} = 3$$ **1**

$\therefore$ Coordinate of the point P (1, 3)

OR

(b)

$AB = \sqrt{18} = 3\sqrt{2}$ ½

$BC = \sqrt{8} = 2\sqrt{2}$ ½

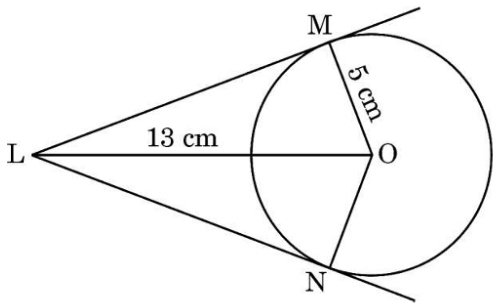
$AC = \sqrt{50} = 5\sqrt{2}$ ½

$3\sqrt{2} + 2\sqrt{2} = 5\sqrt{2}$

$AB + BC = AC$ ½

$\Rightarrow$ A, B and C are collinear.

24. In the given figure, from a point L which is at a distance of 13 cm from the centre O of a circle of radius 5 cm, the pair of tangents LM and LN are drawn to the circle. Find the perimeter of quadrilateral LMON.



Solution: In Δ OLM, $\angle OML = 90°$

$\therefore$ LM = $\sqrt{(13)^2 - (5)^2}$ = 12 (By Pythagoras. theorem) **1**

LM = LN = 12 cm (tangents from external point to the circle are equal in length)

OM = ON = 5 cm

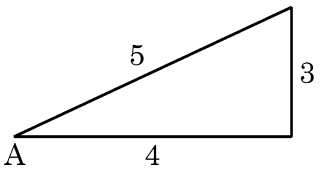
$\therefore$ Perimeter of quadrilateral LMON = 12 + 12 + 5 + 5 = 34 cm. **1**

25. If 3 cot A = 4, then determine the value of $\cos^2 A - \sin^2 A$.

Solution:

$$\cos^2 A - \sin^2 A = \left(\frac{4}{5}\right)^2 - \left(\frac{3}{5}\right)^2$$

$$= \frac{7}{25}$$



½ + ½

1

SECTION C

*This section comprises **6** Short Answer (SA) type questions carrying **3** marks each.* *6×3=18*

26. (a) Solve the following system of linear equations :

$$\frac{x}{a} - \frac{y}{b} = 0;\ ax + by = a^2 + b^2$$

OR

(b) For what value of 'p' will the following system of linear equations have ***no*** solution ?

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

$3x + y = 1$

Solution: (a) Solving the given equations to get x = a

and y = b

1½

1½

OR

(b)

For no solution,

$$\frac{2p-1}{3} = \frac{p-1}{1} \neq \frac{2p+1}{1}$$ 1

$\frac{2p-1}{3} = \frac{p-1}{1} \Rightarrow p = 2$ and $\frac{p-1}{1} \neq \frac{2p+1}{1} \Rightarrow p \neq -2$ 2

27. If the point Q(0, 1) is equidistant from points P(5, – 3) and R(x, 6), then find the value/s of x. Also, find the distance QR and PR.

Solution:

PQ = RQ

$\sqrt{(5-0)^2 + (-3-1)^2} = \sqrt{(x-0)^2 + (6-1)^2}$

$\sqrt{25+16} = \sqrt{x^2+25}$

Squaring both sides,

$41 = (x)^2 + 25$

$(x)^2 = 16$

$x = 4, -4$ **1**

R (4, 6) or R (–4, 6)

When $x = 4$:

QR $= \sqrt{41}$

PR $= \sqrt{82}$ **1**

When $x = -4$:

QR $= \sqrt{41}$

PR $= \sqrt{162}$ *or* $9\sqrt{2}$ **1**

28. Prove that :

$$\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$$

Solution: LHS $= \dfrac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta}$

$= \dfrac{\sin\theta(1 - 2\sin^2\theta)}{\cos\theta(2\cos^2\theta - 1)}$ **1**

$= \dfrac{\sin\theta(1 - 2\sin^2\theta)}{\cos\theta[2(1 - \sin^2\theta) - 1]}$ **1**

$= \frac{\sin\theta\,(1-2\sin^2\theta)}{\cos\theta\,(2-2\sin^2\theta-1)}$ $= \frac{\sin\theta\,(1-2\sin^2\theta)}{\cos\theta\,(1-2\sin^2\theta)} = \tan\theta = \text{RHS}$	**1**
29. (a) The length of the minute-hand of a clock is 14 cm. Find the area swept by this minute-hand in 5 minutes. **OR** (b) To warn ships for underwater rocks, a lighthouse throws a red coloured light over a sector of central angle 80° up to a distance of 16·5 km. Find the area of the sea over which the ships are warned.	
Solution: (a)Angle made by minute hand in 5 minutes $= \frac{360}{60} \times 5 = 30°$ $\therefore\ \theta = 30°$ Length of minute hand = radius = 14 cm Area swept by minute hand in 5 minutes =Area of sector $= \frac{\pi r^2\theta}{360°}$ $= \frac{22}{7} \times 14 \times 14 \times \frac{30}{360}$ $= \frac{154}{3}\ \text{cm}^2$ or $51.33\ \text{cm}^2$ **OR** (b) $\theta = 80°,\ \ r = 16.5$ km. Area of the sea $= \frac{\pi r^2\theta}{360°}$ $= \frac{22}{7} \times 16.5 \times 16.5 \times \frac{80}{360}$ $= \frac{1331}{7}\ \text{km}^2$ or $190.14\ \text{km}^2$	**1** **1** **1** 2 **1**

30. The following table shows the marks obtained by 110 students of class X in a school during a particular academic session. Find the mode of the distribution.

Marks Obtained :	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Number of Students :	21	25	30	24	10

Solution: Modal Class is 40 – 60

$l = 40, f_1 = 30, f_0 = 25, f_2 = 24, h = 20$

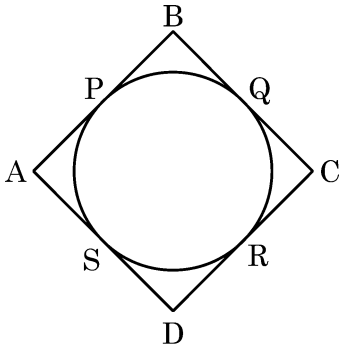
$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$$

$$= 40 + \left(\frac{30 - 25}{60 - 25 - 24}\right) \times 20 \qquad 2\frac{1}{2}$$

$$= 40 + 9.1 = 49.1 \qquad \frac{1}{2}$$

31. Prove that the parallelogram circumscribing a circle is a rhombus.

Solution:



The lengths of tangents drawn from an external point to a circle are equal.

$\therefore$ AP = AS (i)

BP = BQ (ii)

CR = CQ (iii)

DR = DS (iv) **1**

Adding (i), (ii), (iii) and (iv)

AP + BP + CR + DR = AS + BQ + CQ + DS

$\therefore$ AB + CD = AD + BC **1**

$\Rightarrow$ 2AB = 2 BC [As ABCD is parallelogram $\therefore$ AB = CD, AD = BC]

$\Rightarrow$ AB = BC

$\therefore$ AB = BC = CD = DA

$\therefore$ Parallelogram ABCD is a rhombus. } **1**

SECTION D

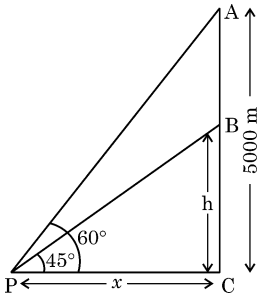
*This section comprises **4** Long Answer (LA) type questions carrying **5** marks each.* *4×5=20*

32. (a) An aeroplane when flying at a height of 5000 m above the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from a point on the ground are 60° and 45° respectively. Find the vertical distance between the aeroplanes at that instant. [Use $\sqrt{3}$ = 1·732]

OR

(b) A TV tower stands vertically on a bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is 60°. From a point 20 m away from this point on the same bank, the angle of elevation of the top of the tower is 30°. Find the height of the tower and the width of the canal. [Use $\sqrt{3}$ = 1·73]

Solution: (a)



1 For Figure

Let A and B be the positions of two aeroplanes.

Let BC = h, PC = x

In right Δ BCP,

$\tan 45° = \frac{h}{x} \quad \Rightarrow x = h$ ---------- (i)

In right Δ ACP,

$\tan 60° = \frac{5000}{x} \Rightarrow \sqrt{3}\, x = 5000$

1½

$\sqrt{3}$ h = 5000 (using (i) x = h)

$$h = \frac{5000}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{5000\sqrt{3}}{3}$$ **1½**

$\therefore$ Vertical distance between aeroplanes = AB = 5000 – h

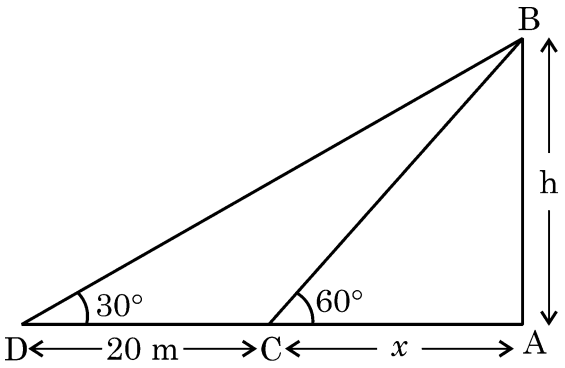
$$= 5000 - \frac{5000\sqrt{3}}{3}$$

$$= 5000 - \frac{5000\ (1.732)}{3}$$

$$= 2113.33 \text{ m}$$ **1**

OR

(b)



1 For Figure

In right Δ BAC, $\frac{h}{x} = \tan 60° \Rightarrow \quad h = \sqrt{3}\,x$ (i) **1½**

In right Δ BAD, $\frac{h}{20 + x} = \tan 30°$

$\sqrt{3}$ h = 20 + x

$\sqrt{3}$ ($\sqrt{3}x$) = 20 + x (Using (i) h = $\sqrt{3}\,x$)

$3x = 20 + x$

x = 10 m **1½**

$\therefore$ Width of canal = 10 m.

Height of tower h = $\sqrt{3}\,x$

h = $10\sqrt{3}$ m

h = 10(1.73) = 17.3 m **1**

33. (a) In a class test, the sum of marks obtained by Ananya in Mathematics and Science is 28. Had she got 3 marks more in Mathematics and 4 marks less in Science, the product of marks obtained in the two subjects would have been 180. Find the marks obtained in the two subjects separately.

OR

(b) Solve for x :

$$\frac{150}{x} + x + 18 = 10x + \frac{15}{x};\ x \neq 0$$

Solution: (a)

Let marks obtained by Ananya in Mathematics be x

Sum of marks = 28

$\therefore$ Marks in Science = $28 - x$

ATQ

$(x + 3)(28 - x - 4) = 180$ **2**

$(x + 3)(24 - x) = 180$

$x^2 - 21x + 108 = 0$

$(x - 12)(x - 9) = 0$ **1**

$x = 12, 9$ **1**

If Marks in Mathematics = 12

then Marks in Science = $28 - 12 = 16$ **½**

If Marks in Mathematics = 9

then Marks in Science = $28 - 9 = 19$ **½**

OR

(b)

$\frac{150}{x} + x + 18 = 10x + \frac{15}{x}$ **2**

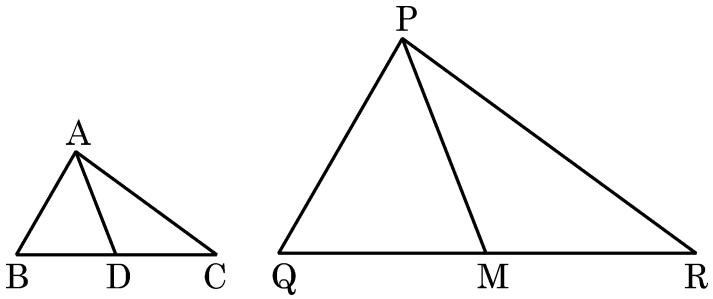
$9x^2 - 18x - 135 = 0$ or $x^2 - 2x - 15 = 0$ **2**

$(x - 5)(x + 3) = 0$

$x = 5, -3$ **1**

34. If AD and PM are medians of triangles ABC and PQR respectively, where $\Delta ABC \sim \Delta PQR$, then prove that $\frac{AB}{PQ} = \frac{AD}{PM}$.

Solution:



Given: AD and PM are medians of ΔABC and ΔPQR respectively.

Also $\Delta ABC \sim \Delta PQR$

To Prove: $\frac{AB}{PQ} = \frac{AD}{PM}$

Proof:

$\Delta ABC \sim \Delta PQR$

$\Rightarrow \frac{AB}{PQ} = \frac{BC}{QR}$ **1**

$\frac{AB}{PQ} = \frac{\frac{1}{2}BC}{\frac{1}{2}QR}$

$\frac{AB}{PQ} = \frac{BD}{QM}$ ($\because$ D is midpoint of BC and M is midpoint of QR) **1**

In ΔABD and ΔPQM,

$\angle B = \angle Q$ ($\because \Delta ABC \sim \Delta PQR$)

$\frac{AB}{PQ} = \frac{BD}{QM}$ (Proved above)

$\therefore$ $\Delta ABD \sim \Delta PQM$ (SAS similarity)

$\therefore$ Their corresponding sides are proportional **2**

$\Rightarrow \frac{AB}{PQ} = \frac{AD}{PM}$ Hence proved **1**

35. A tent is in the shape of a cylinder surmounted by a conical top of same radius. If the height and diameter of the cylindrical part are 2·1 m and 4 m respectively, and the slant height of the top is 2·8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of ₹ 500 per m^2.

Solution:(a)

Radius of cone = radius of cylinder = $\frac{4}{2}$ m = 2 m

Slant height of cone = 2.8 m

Height of cylinder = 2.1 m

Surface Area of the tent = Surface area of cone + Surface area of cylinder

$= \pi rl + 2\pi rh$

$= \pi r(l + 2h) = \frac{22}{7} \times 2\ [2.8 + 2 \times 2.1]$ **1½+1½**

$= 44\ m^2$ **1**

Cost of canvas of tent at the rate of ₹ 500 per m^2 = 44 × 500 = ₹ 22,000 **1**

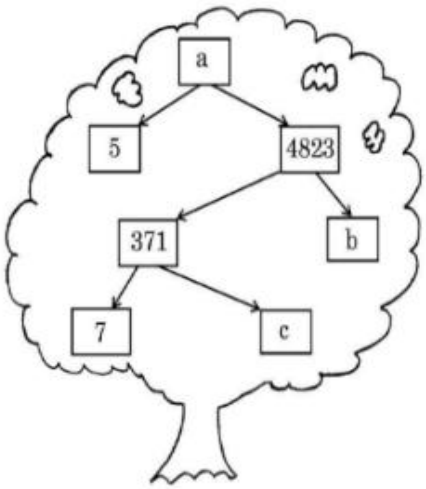
SECTION E

*This section comprises **3** case study based questions carrying **4** marks each.* *3×4=12*

Case Study – 1

36. A Mathematics exhibition is being conducted in your school and one of your friends is making a model of a 'factor tree'. He has some difficulty and asks for your help in completing a quiz for the audience.

Observe the following 'factor tree' and answer the following questions :



(i) What is the value of a ? *1*

(ii) (a) What is the value of b ? *2*

OR

(b) What is the value of c ? *2*

(iii) Write the prime factorisation of 24115. *1*

Solution:

(i) $a = 5 \times 4823 = 24115$ — 1

(ii) (a) $4823 = 371 \times b$

$b = \frac{4823}{371} = 13$ — 2

OR

(ii) (b) $371 = 7 \times c$

$c = \frac{371}{7} = 53$ — 2

(iii) $24115 = 5 \times 7 \times 13 \times 53$ — 1

Case Study – 2

37. In a charming village, there is a street called 'Maplewood Avenue', where the houses are numbered from 1 to 49. A community group has decided to undertake a green renovation project, aiming to install solar panels on the houses.

They have a few questions before they begin the project.

(i) How many houses are there on 'Maplewood Avenue' ? *1*

(ii) The house numbers follow an Arithmetic Progression. What is the first term of the A.P. and the common difference ? *1*

(iii) (a) If the group wanted to calculate the sum of all house numbers from 1 to 49, how much would that be ? *2*

OR

(b) What is the sum of the house numbers between 15 and 30 ? *2*

Solution: (i) 49 houses — 1

(ii) First term 'a' = 1, common difference = 1 — 1

(iii) (a) Sum $(S_{49}) = \frac{n}{2}[a + l]$

$= \frac{49}{2}[1 + 49]$ — **1½**

$= 1225$ — **½**

OR

(iii) (b) Sum of house numbers between 15 & 30

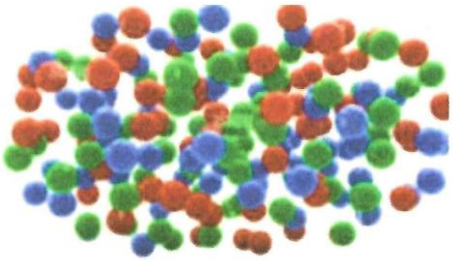
$16 + 17 + 18 + \ldots\ldots\ldots + 29$

$= \frac{n}{2}[2a + (n - 1)\,d] = \frac{14}{2}[2 \times 16 + 13]$ — **1½**

$= 315$ — **½**

Case Study – 3

38. Aarav and Ashima are brother and sister and on Ashima's birthday, Aarav gifts her a bag filled with 8 red toffees, 10 green toffees and 6 blue toffees. Ashima decides to randomly draw a toffee from the bag. She wants to find the chances of picking a toffee of specific colour and asks the following questions :



(i) What is the probability of getting a green toffee ? *1*

(ii) What is the probability of getting a blue toffee ? *1*

(iii) (a) What is the probability of getting a non-red toffee ? *2*

OR

(b) What is the probability of getting a red or a green toffee ? *2*

Solution: (i) P (green toffee) = $\frac{10}{24}$ *or* $\frac{5}{12}$ — 1

(ii) P (blue toffee) = $\frac{6}{24}$ *or* $\frac{1}{4}$ — 1

(iii) (a) P (non-red toffee) = $\frac{10+6}{24} = \frac{16}{24}$ *or* $\frac{2}{3}$ — 2

OR

(iii) (b) P (Red or Green toffee) = $\frac{8+10}{24} = \frac{18}{24}$ *or* $\frac{3}{4}$ — 2