Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2023
SUBJECT NAME MATHEMATICS (BASIC)
(PAPER CODE 430/6/3)

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. Its' 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. In class-X, while evaluating two competency-based questions, please try to understand given Answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.**
4	The Marking scheme carries only suggested value points for the **Answer**s 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 the 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"**. However, for MCQs (Q1 to Q20), only first attempt to be evaluated.
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).
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. ● **Answer**s 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 un assessed 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 **Answer**s 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.

MARKING SCHEME
MATHEMATICS (BASIC) 430/6/3

1 The prime factorisation of the number 5488 is

(a) $2^3 \times 7^3$ (b) $2^4 \times 7^3$

(c) $2^4 \times 7^4$ (d) $2^3 \times 7^4$

Answer (b) $2^4 \times 7^3$ 1

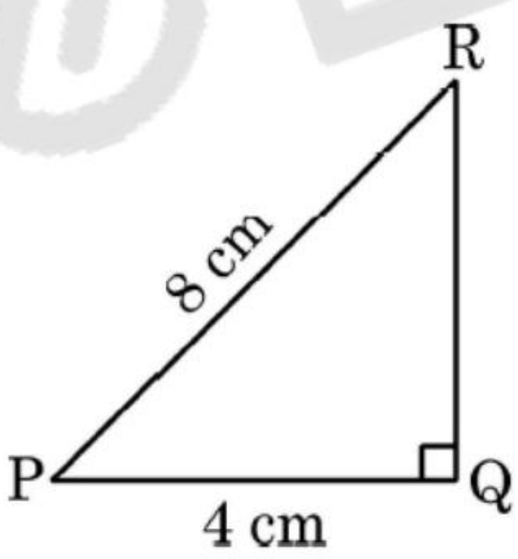
2 The Empirical relation between the three measures of central tendency is

(a) Mode = 3 Mean – 2 Median (b) Mode = 2 Median – 3 Mean

(c) Mode = 2 Mean – 3 Median (d) Mode = 3 Median – 2 Mean

Answer (d) Mode = 3 Median – 2 Mean 1

3 In the given figure, ΔPQR is a right triangle right angled at Q. If PQ = 4 cm and PR = 8 cm, then $\angle P$ is



(a) 60° (b) 45°

(c) 30° (d) 15°

Answer (a) 60° 1

4 The median of first 10 natural numbers is

(a) 5 (b) 6

(c) 5.5 (d) 6.5

Answer (c) 5.5 1

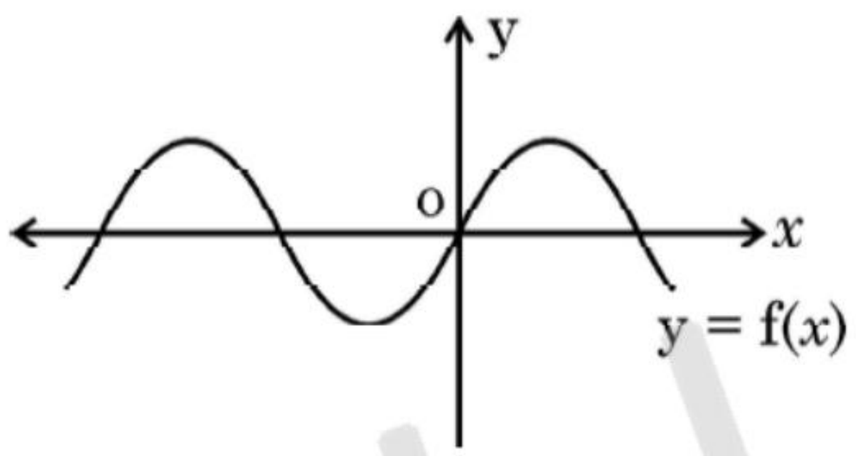
5 The zeroes of the polynomial $p(x) = 2x^2 - x - 3$ are

(a) $-\frac{3}{2}, 1$ (b) $\frac{3}{2}, 1$

(c) $-\frac{3}{2}, -1$ (d) $\frac{3}{2}, -1$

Answer (d) $\frac{3}{2}, -1$ 1

6 The graph of $y = f(x)$ is shown in the figure for some polynomial $f(x)$. The number of zeroes of $f(x)$ are



(a) 4 (b) 3

(c) 2 (d) 1

Answer (a) 4 1

7 The distance of the point (5, 0) from the origin is

(a) 0 (b) 5

(c) $\sqrt{5}$ (d) 5^2

Answer (b) 5 1

8 If the mean of 6, 7, x, 8, y, 14 is 9, then

(a) $x + y = 21$ (b) $x + y = 19$

(c) $x - y = 19$ (d) $x - y = 21$

Answer (b) x + y = 19 1

9 If n is a natural number, then 8^n cannot end with digit

(a) 0 (b) 2

(c) 4 (d) 6

Answer (a) 0 1

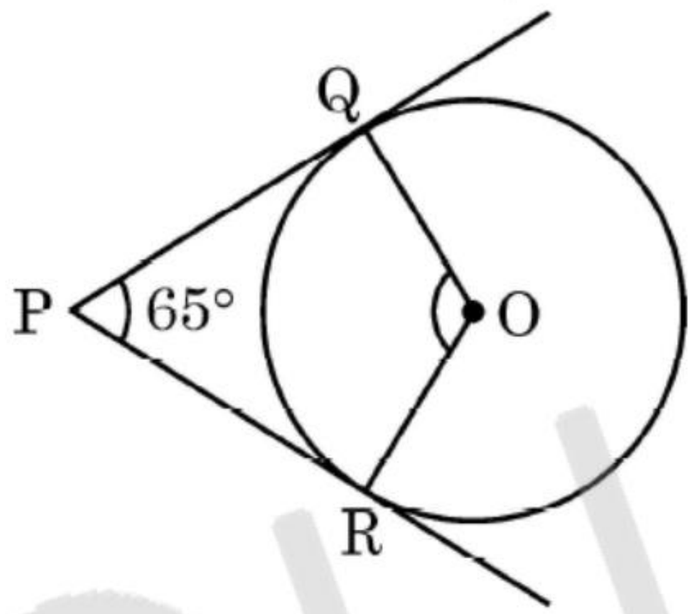
10 Area of a quadrant of a circle of radius 7 cm is

(a) $154\ cm^2$ (b) $77\ cm^2$

(c) $\frac{77}{2}\ cm^2$ (d) $\frac{77}{4}\ cm^2$

Answer (c) $\frac{77}{2}\ cm^2$ 1

11 In the given figure, PQ and PR are tangents drawn from P to the circle with centre O such that $\angle QPR = 65°$. The measure of $\angle QOR$ is.



(a) 65° (b) 125°

(c) 115° (d) 90°

Answer (c) 115° 1

12 One card is drawn at random from a well-shuffled deck of 52 playing cards. What is the probability of getting a black king ?

(a) $\frac{1}{26}$ (b) $\frac{1}{13}$

(c) $\frac{1}{52}$ (d) $\frac{1}{2}$

Answer (a) $\frac{1}{26}$ 1

13 The value of k, if (6, k) lies on the line represented by $x - 3y + 6 = 0$, is

(a) -4 (b) 12

(c) -12 (d) 4

Answer (d) 4 1

14	If (2, 4) is the mid-point of the line-segment joining (6, 3) and (a, 5), then the value of a is (a) 2 (b) 4 (c) -4 (d) -2	
Answer	(d) -2	1
15	An unbiased die is thrown. The probability of getting an odd prime number is (a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{1}{3}$	
Answer	(d) $\frac{1}{3}$	1
16	The value of 'k' for which the system of equations $kx + 2y = 5$ and $3x + 4y = 1$ have no solution, is (a) $k = \frac{3}{2}$ (b) $k \neq \frac{3}{2}$ (c) $k \neq \frac{2}{3}$ (d) $k = 15$	
Answer	(a) $k = \frac{3}{2}$	1
17	If -5, x, 3 are three consecutive terms of an A.P., then the value of x is (a) -2 (b) 2 (c) 1 (d) -1	
Answer	(d) -1	1
18	If HCF (72, 120) = 24, then LCM (72, 120) is (a) 72 (b) 120 (c) 360 (d) 9640	
Answer	(c) 360	1

19 **Directions for Q. 19 & Q. 20** : In question numbers **19** and **20**, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option :

(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.

Assertion (A) : For $0 < \theta \leq 90^\circ$, cosec $\theta - \cot \theta$ and cosec $\theta + \cot \theta$ are reciprocal of each other.

Reason (R) : $\cot^2 \theta - \text{cosec}^2 \theta = 1$

Answer (c) Assertion (A) is true, but Reason (R) is false. 1

20 **Assertion (A) :** The probability that a leap year has 53 Sundays is $\frac{2}{7}$.

Reason (R) : The probability that a non-leap year has 53 Sundays is $\frac{1}{7}$.

Answer (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). 1

SECTION B

Section – B consists of Very Short Answer (VSA) type questions of **2** marks each.

21 A bag contains 30 discs numbered from 1 to 30. One disc is drawn at random from the bag. Find the probability that it bears a number

(a) divisible by 6.

(b) greater than 25.

Solution (i) P (Number divisible by 6) = $\frac{5}{30}$ or $\frac{1}{6}$ *1*

(ii) P (Number greater than 25) = $\frac{5}{30}$ or $\frac{1}{6}$ *1*

22 (a) Find the value of k for which the roots of the quadratic equation $5x^2 - 10x + k = 0$ are real and equal.

Solution (a) $5x^2 - 10x + k = 0$; $a = 5, b = -10, c = k$ ½

Roots are real and equal

$D = 0 \Rightarrow b^2 - 4ac = 0$ ½

$(-10)^2 - 4(5)(k) = 0 \Rightarrow 100 - 20k = 0$ ½

$k = 5$ ½

OR

22 (b) If one root of the quadratic equation $3x^2 - 8x - (2k + 1) = 0$ is seven times the other, then find the value of k.

Solution

(b) Let roots be $\alpha, 7\alpha$ ½

$\alpha + 7\alpha = -\left(\frac{-8}{3}\right) = \frac{8}{3} \Rightarrow 8\alpha = \frac{8}{3}$ gives $\alpha = \frac{1}{3}$ ½

$\alpha(7\alpha) = -\frac{(2k+1)}{3} \Rightarrow 7\alpha^2 = -\frac{(2k+1)}{3}$ ½

$k = -\frac{5}{3}$ ½

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23 Evaluate : $5\ \text{cosec}^2 45° - 3\ \sin^2 90° + 5\ \cos 0°$.

Solution

$5\ \text{cosec}^2 45° - 3\ \sin^2 90° + 5\ \cos 0°$

$=5\left(\sqrt{2}\right)^2 - 3(1)^2 + 5(1)$ $1\frac{1}{2}$

$= 12$ $\frac{1}{2}$

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24 From a point P, the length of the tangent to a circle is 24 cm and the distance of P from the centre of the circle is 25 cm. Find the radius of the circle.

Solution

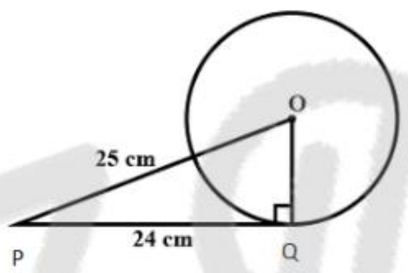

Figure ½

$OQ = \sqrt{25^2 - 24^2}$ *1*

$OQ = 7$ cm ½

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25 (a) Find a quadratic polynomial whose zeroes are 6 and –3.

Solution

(a) Sum of zeroes=6+ (–3) = 3 $\frac{1}{2}$

Product of zeroes = 6(– 3) = – 18 $\frac{1}{2}$

Quadratic polynomial is $(x^2 - 3x - 18)$ or $k\ (x^2 - 3x - 18)$ *1*

OR

25 Find the zeroes of the polynomial $x^2 + 4x - 12$.

Solution

(b) $x^2 + 4x - 12 = (x + 6)(x - 2)$ 1

Zeroes are -6 and 2 1

SECTION C

26 Prove that $7 + 4\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is an irrational number.

Solution

Let us assume that $7 + 4\sqrt{5}$ is rational

$7 + 4\sqrt{5} = \frac{p}{q}$; $q \neq 0$ and p, q are integers 1

$\Rightarrow \sqrt{5} = \frac{p-7q}{4q}$ 1

Clearly $\frac{p-7q}{4q}$ is rational but $\sqrt{5}$ is irrational

Our assumption is wrong $\Rightarrow 7+4\sqrt{5}$ is irrational. } 1

27 Solve for x :

$$\frac{1}{x}-\frac{1}{x-2}=3;\ x\neq 0,\ 2$$

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

$\Rightarrow 3x^2-6x+2=0$ 1

$x=\frac{6\pm 2\sqrt{3}}{6}$ or $\frac{3\pm\sqrt{3}}{3}$ 1

28 (a) Prove that $\frac{\cot A-\cos A}{\cot A+\cos A}=\frac{\cos^2 A}{(1+\sin A)^2}$

Solution

(a)LHS $=\frac{cot\ A-\cos A}{cot\ A+\cos A}=\frac{\frac{cos\ A}{\sin A}-\cos A}{\frac{cos\ A}{\sin A}+\cos A}$ ½

$=\frac{1-sin\ A}{1+sin\ A}$ 1

$=\frac{(1-\sin A)(1+\sin A)}{(1+\sin A)(1+\sin A)}$ *1*

$=\frac{1-\sin^2 A}{(1+\sin A)^2}=\frac{cos^2 A}{(1+\sin A)^2}$ ½

OR

28 (b) Prove that $(\sec\theta+\tan\theta)(1-\sin\theta)=\cos\theta$

Solution

(b) LHS $=(\sec\theta+\tan\theta)(1-\sin\theta)$

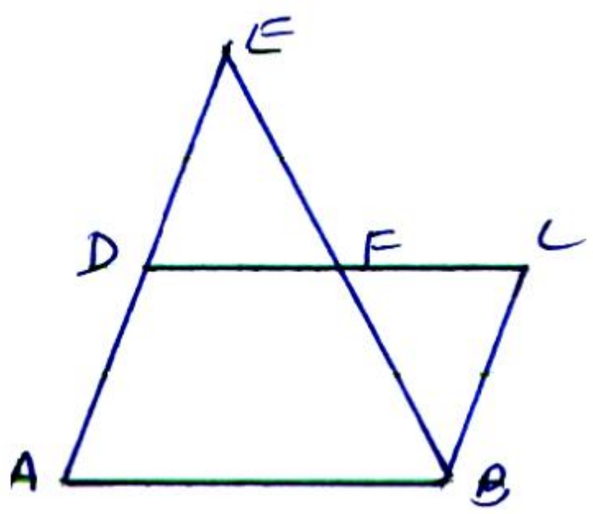
$=\left(\frac{1}{cos\ \theta}+\frac{\sin\theta}{\cos\theta}\right)(1-\sin\theta)$ *1*

$=\left(\frac{1+\sin\theta}{\cos\theta}\right)(1-\sin\theta)=\frac{(1-\sin^2\theta)}{\cos\theta}$ ½ + ½

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

29 (a) E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\Delta ABE \sim \Delta CFB$.

Solution



(a)ABCD is a parallelogram (1 for figure)

To prove: $\Delta ABE \sim \Delta CFB$

In ΔABE and ΔCFB,

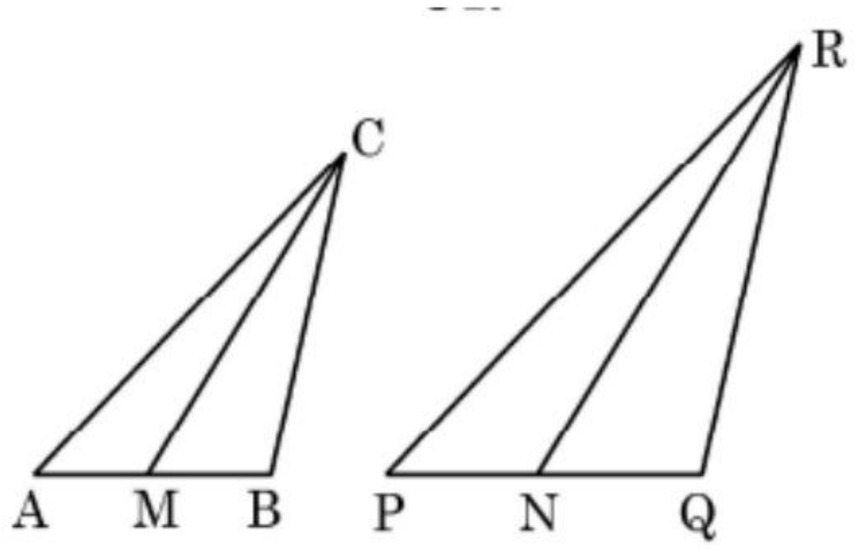
$\angle A = \angle C$ (opp. angles of parallelogram) ½

$\angle AEB = \angle CBF$ (alt. int. angles) ½

$\therefore \Delta ABE \sim \Delta CFB$ (AA similarity) *1*

OR

29 (b)



In the given figure, CM and RN are respectively the medians of ΔABC and ΔPQR. If $\Delta ABC \sim \Delta PQR$, then prove that $\Delta AMC \sim \Delta PNR$.

Solution (b) $\Delta ABC \sim \Delta PQR$

$\frac{AB}{PQ} = \frac{AC}{PR} \Rightarrow \frac{2AM}{2PN} = \frac{AC}{PR}$ ½+1

$\frac{AM}{PN} = \frac{AC}{PR}$

Also $\angle A = \angle P$ $(\Delta ABC \sim \Delta PQR)$ }

$\therefore \Delta AMC \sim \Delta PNR$ (SAS similarity) } 1½

30 A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household :

Family size	1-3	3-5	5-7	7-9	9-11
Number of Families	7	8	2	2	1

Find the median of this data.

Solution

Family size	1 – 3	3 – 5	5 – 7	7 – 9	9 – 11
Number of families	7	8	2	2	1
Cf	7	15	17	19	20

for correct cf 1

Median class 3 – 5 ½

Median $= l + \frac{\frac{N}{2} - \text{cf}}{f} \times h$

$= 3 + \frac{10-7}{8} \times 2$ 1

$= 3 \cdot 75$ ½

31 Find the co-ordinates of the points of trisection of the line-segment joining the points (5, 3) and (4, 5).

Solution

A C D B

(5, 3) (4, 5)

Let C divides AB in the ratio 1 : 2 ½

$\therefore C\left(\frac{1\times4+2\times5}{1+2}, \frac{1\times5+2\times3}{1+2}\right)$, i.e., $C\left(\frac{14}{3}, \frac{11}{3}\right)$ *1*

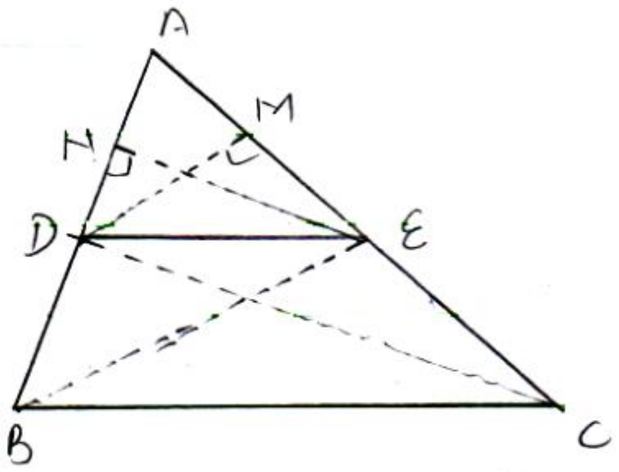
Let D divides AB in the ratio 2 : 1 ½

$\therefore D\left(\frac{2\times4+1\times5}{2+1}, \frac{2\times5+1\times3}{2+1}\right)$, i.e., $D\left(\frac{13}{3}, \frac{13}{3}\right)$ *1*

SECTION D

32 (a) Prove that a line drawn parallel to one side of a triangle to intersect the other two sides in distinct points, divides the two sides in the same ratio.

Solution (a)



1 for figure

Given In Δ ABC, DE // BC $\frac{1}{2}$

To prove : $\frac{AD}{DB} = \frac{AE}{EC}$ $\frac{1}{2}$

Const.: Join BE, CD. Draw DM ⊥ AC and EN ⊥ AB $\frac{1}{2}$

Proof : $\frac{ar(\Delta \text{ ADE})}{ar(\Delta \text{ BDE})} = \frac{\frac{1}{2}\times \text{AD} \times \text{EN}}{\frac{1}{2}\times \text{DB} \times \text{EN}} = \frac{AD}{DB}$ _____ (i) *1*

similarly $\frac{ar(\Delta \text{ ADE})}{ar(\Delta \text{ CDE})} = \frac{AE}{EC}$ _____ (ii) $\frac{1}{2}$

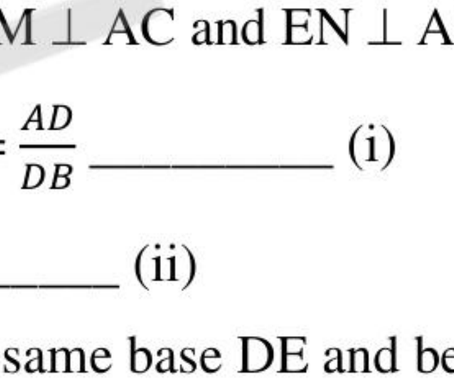
Δ BDE and Δ CDE are on the same base DE and between the same parallel lines BC and DE.

ar(Δ ADE) = ar(Δ CDE) _____ (iii) $\frac{1}{2}$

From (i), (ii) and (iii) $\frac{AD}{DB} = \frac{AE}{EC}$ $\frac{1}{2}$

OR

(b) In the given figure, $\frac{\text{QR}}{\text{QS}} = \frac{\text{QT}}{\text{PR}}$ and $\angle 1 = \angle 2$. Prove that $\Delta PQS \sim \Delta TQR$.



Solution (b) In Δ PQR, $\angle 1 = \angle 2$

$\therefore$ PQ = PR (sides opposite to equal angles) 1

Now $\frac{QR}{QS} = \frac{QT}{PR}$

$\Rightarrow \frac{QS}{QR} = \frac{PR}{QT} \Rightarrow \frac{QS}{QR} = \frac{PQ}{QT}$ (as PR = PQ) _____ (i) 2

In Δ PQS and Δ TQR,

$\angle$ Q = $\angle$ Q (common)

$\frac{QS}{QR} = \frac{PQ}{QT}$ (from (i)) $1\frac{1}{2}$

$\therefore$ Δ PQS ~ Δ TQR (SAS similarity) $\frac{1}{2}$

33 (a) From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45° respectively. If the bridge is at a height of 3 m from the banks, find the width of the river. (Use $\sqrt{3} = 1.73$)

Solution (a)

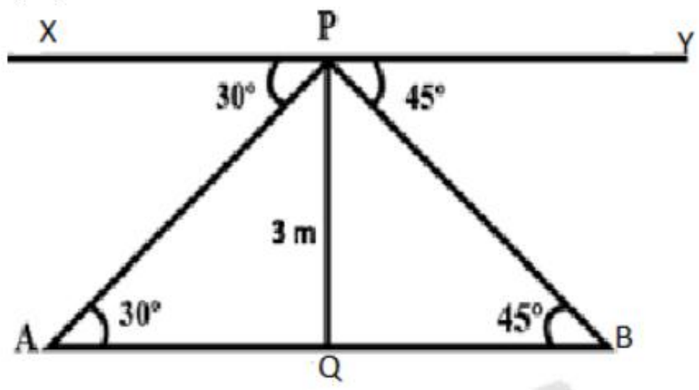


fig. 1

In Δ APQ, $\tan 30° = \frac{3}{AQ}$ 1

$\frac{1}{\sqrt{3}} = \frac{3}{AQ} \Rightarrow AQ = 3\sqrt{3}$ ½

In Δ PBQ, $\tan 45° = \frac{3}{BQ}$ 1

BQ = 3 ½

$\therefore$ AB = AQ + BQ = $3\sqrt{3} + 3$ ½

$= 3(1{\cdot}73 + 1) = 8{\cdot}19$ ½

Width of river = 8·19 m

OR

(b) From a point on the ground, the angle of elevation of the bottom and top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower. (Use $\sqrt{3} = 1.73$)

Solution (b) BC = transmission tower = h and AD = x

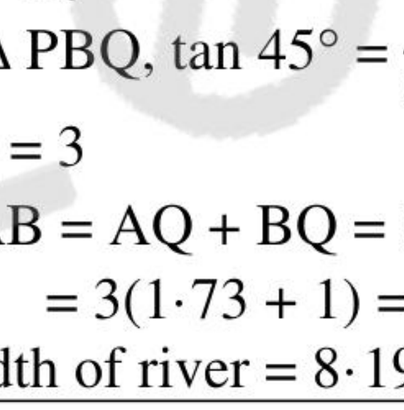
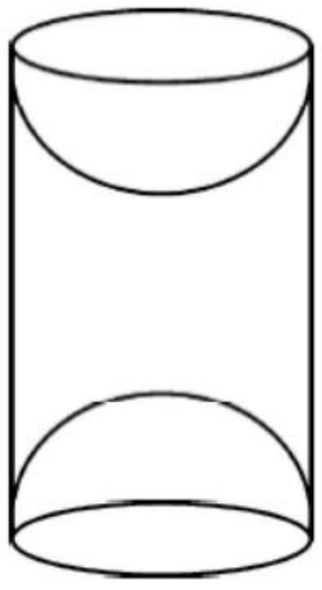


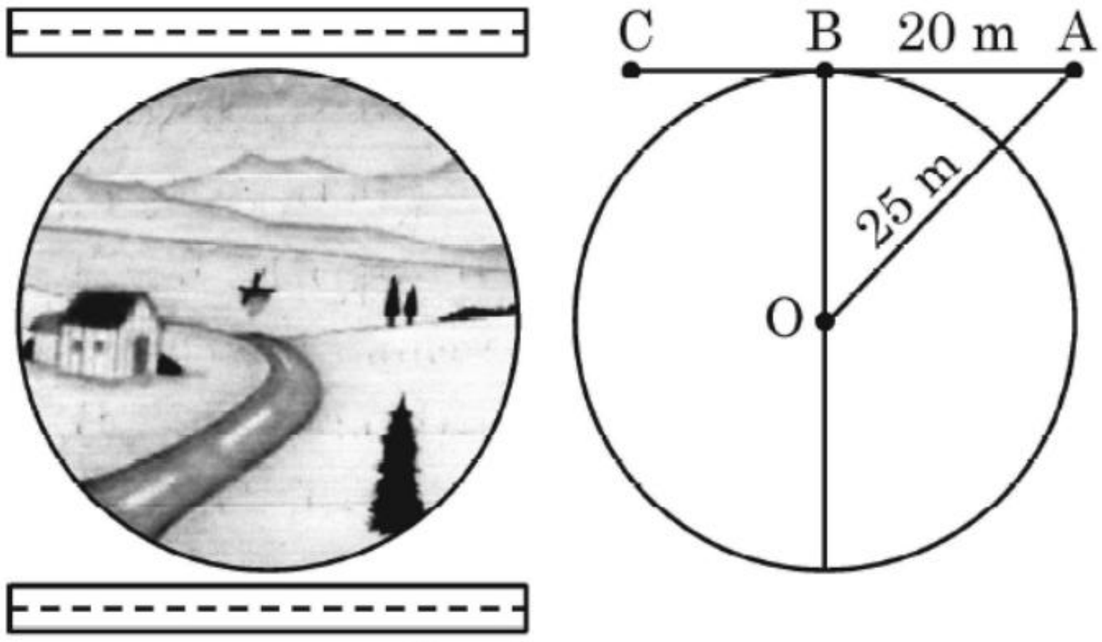
fig. 1

In Δ ABD, $\tan 45° = \frac{20}{x}$ 1

x = 20 ½

	In Δ ACD, $\tan 60° = \frac{20 + h}{x}$	1
	$\sqrt{3}x = 20 + h$	½
	$\therefore h = 20 (\sqrt{3} - 1)$ m	½
	h = 14.6 m	½
34	The sum of the 4th and 8th term of an A.P. is 24 and the sum of the 6th and 10th term of the A.P. is 44. Find the A.P. Also, find the sum of first 25 terms of the A.P.	
Solution	$a_4 + a_8 = 24, \Rightarrow a + 3d + a + 7d = 24$	1
	$\Rightarrow 2a + 10d = 24$ or $a + 5d = 12$ _____ (i)	$\frac{1}{2}$
	$a_6 + a_{10} = 44 \Rightarrow a + 5d + a + 9d = 44$	
	$2a + 14d = 44$ or $a + 7d = 22$ _____ (ii)	1
	Solving (i) and (ii), $d = 5, a = -13$	$\frac{1}{2} + \frac{1}{2}$
	$\therefore$ AP is $-13, -8, -3, 2, 7, ...$	$\frac{1}{2}$
	$S_{25} = \frac{25}{2}[2a + 24d]$	
	$= \frac{25}{2}[-26 + 120]$	$\frac{1}{2}$
	$= 1175$	$\frac{1}{2}$
35	A wooden article was made by scooping out a hemisphere from each end of a solid cylinder (as shown in the figure). If the height of the cylinder is 10 cm and its base is of radius 3.5 cm, find the total surface area of the article.	
		
Solution	Total surface area of the article = CSA of cylinder + CSA of 2 hemispheres	1
	$= 2\pi rh + 2(2\pi r^2)$	
	$= 2\times \frac{22}{7} \times \frac{7}{2} \times 10 + 4 \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2}$	*1+1*
	$= 2 \times \frac{22}{7} \times \frac{7}{2}(10 + 2 \times \frac{7}{2})$	*1*
	$= 22(10 + 7)$	
	$= 22 \times 17 = 374$ cm^2	*1*

36 **Section – E** comprises of **3** Case Study questions each of **4** marks.



People of a circular village Dharamkot want to construct a road nearest to it. The road cannot pass through the village. But the people want the road at a shortest distance from the centre of the village. Suppose the road starts from A which is outside the circular village (as shown in the figure) and touch the boundary of the circular village at B such that AB = 20 m. Also the distance of the point A from the centre O of the village is 25 m.

Based on the above information, answer the following questions :

(i) If B is the mid-point of AC, then find the distance AC.

(ii) Find the shortest distance of the road from the centre of the village.

(iii) Find the circumference of the village.

OR

(iii) Find the area of the village.

Solution

(i) AC = AB + BC = 20 + 20 = 40 m *1*

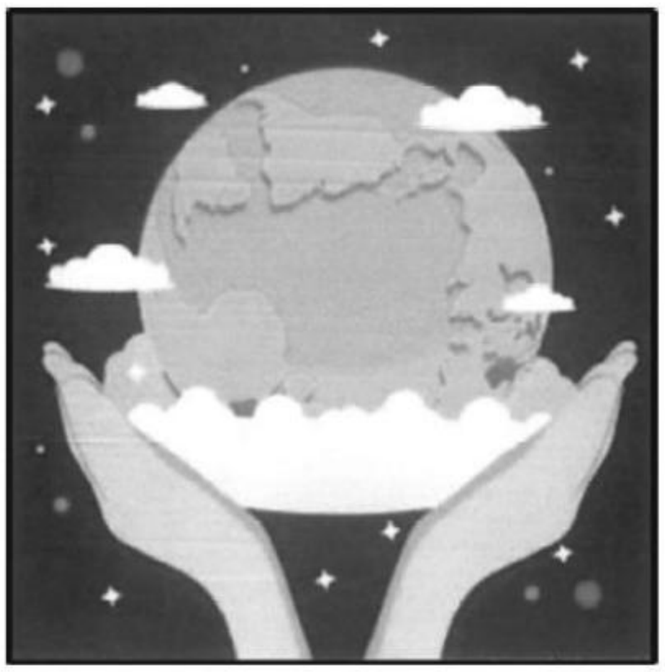
(ii) Shortest distance OB = $\sqrt{25^2 - 20^2}$ = 15 m 1

(iii) Circumference = $2\pi(15) = 30\pi$ m or $\frac{660}{7}$ m 1+1

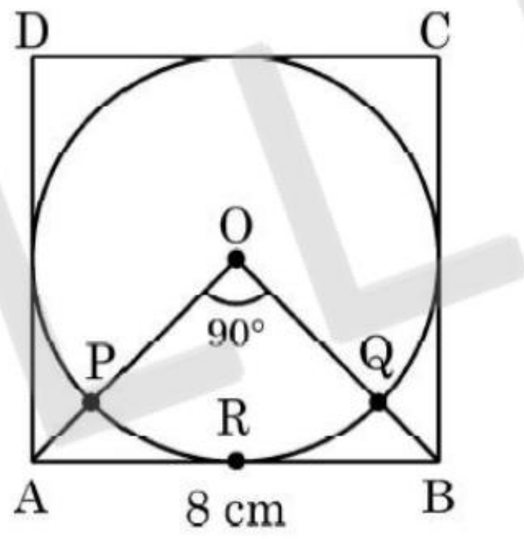
(OR)

(iii) Area = $\pi(15)^2 = 225\pi$ sq. m or $\frac{4950}{7}$ sq. m 1+1

37 For the inauguration of 'Earth day' week in a school, badges were given to volunteers. Organisers purchased these badges from an NGO, who made these badges in the form of a circle inscribed in a square of side 8 cm.



O is the centre of the circle and $\angle AOB = 90°$:



Based on the above information, answer the following questions :

(i) What is the area of square ABCD ?

(ii) What is the length of diagonal AC of square ABCD ?

(iii) Find the area of sector OPRQO.

OR

(iii) Find the area of remaining part of square ABCD when area of circle is excluded.

Solution

(i) Area of square ABCD = $(8)^2 = 64\ cm^2$ 1

(ii) AC = $\sqrt{(8)^2 + (8)^2} = \sqrt{128} = 8\sqrt{2}$ cm 1

(iii) We know that diagonals of square bisect each other at 90°

$\angle AOB = 90°$

Area of sector OPRQ = $\frac{\pi r^2 \theta}{360°}$

$= \frac{22}{7} \times 4 \times 4 \times \frac{90}{360}$ 1

$= \frac{88}{7}\ cm^2$ 1

OR

(iii) Area of circle = $\pi r^2 = \frac{22}{7} \times 4 \times 4 = \frac{352}{7}$ cm^2 1

Required area = $64 - \frac{352}{7} = \frac{96}{7}$ cm^2 1

38

Lokesh, a production manager in Mumbai, hires a taxi everyday to go to his office. The taxi charges in Mumbai consists of a fixed charges together with the charges for the distance covered. His office is at a distance of 10 km from his home. For a distance of 10 km to his office, Lokesh paid ₹ 105. While coming back home, he took another route. He covered a distance of 15 km and the charges paid by him were ₹ 155.

Based on the above information, answer the following questions :

(i) What are the fixed charges ?

(ii) What are the charges per km ?

(iii) If fixed charges are ₹ 20 and charges per km are ₹ 10, then how much Lokesh have to pay for travelling a distance of 10 km ?

OR

(iii) Find the total amount paid by Lokesh for travelling 10 km from home to office and 25 km from office to home. [Fixed charges and charges per km are as in (i) & (ii).

Solution (i) Let fixed charge = ₹ x and charges per km = ₹ y

$x + 10y = 105$, $x + 15y = 155$ $\frac{1}{2}$

On solving, $x = 5$

$\therefore$ Fixed charge = ₹ 5 $\frac{1}{2}$

(ii) on solving, we get y =10
Charge per km = ₹10 *1*

(iii) x + 10y = 20 + 10(10) = ₹ 120 1+1

OR

(iii) Required amount=x + 10y + x + 25y = 2x + 35y 1
= 2(5) + 35(10) = 10 + 350 = ₹ 360 1