



## MATHS

### BOOKS - SELINA MATHS (ENGLISH)

### MATHEMATICS -2016

#### Section A

1. Using remainder theorem, find the value of k if on dividing

$2x^3 + 3x^2 - kx + 5$  by  $x-2$ . leaves a remainder 7



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2.

Given

$$A = \begin{bmatrix} 2 & 0 \\ -1 & 7 \end{bmatrix} \text{ and } I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \text{ and } A^2 = 9A + mI.$$

Find m.



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3. The mean of the following numbers is 68. Find the value of 'x'.

45, 52, 60, x, 69, 70, 26, 81 and 94.

Hence, estimate the median.



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4. The slope of a line joining P(6, k) and Q(1 - 3k, 3) is  $\frac{1}{2}$ . Find :

(i) k



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5. The slope of a line joining P(6, k) and Q(1 - 3k, 3) is  $\frac{1}{2}$ . Find :

(ii) Midpoint of PQ, using the value of 'k' found in (i)



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6. Without using trigonometrical tables, evaluate.

$$\operatorname{cosec}^2 57^\circ - \tan^2 33^\circ + \cos 44^\circ \operatorname{cosec} 46^\circ - \sqrt{2} \cos 45^\circ - \tan^2 60^\circ$$



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7. A certain number of metallic cones, each of radius 2 cm and height 3 cm, are melted and recast into a solid sphere of radius 6 cm. Find the number of cones used.



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8. Solve the following inequation, write the solution set and represent it on the number line.

$$-3(x - 7) \geq 15 - 7x > \frac{x + 1}{3}, x \in R$$

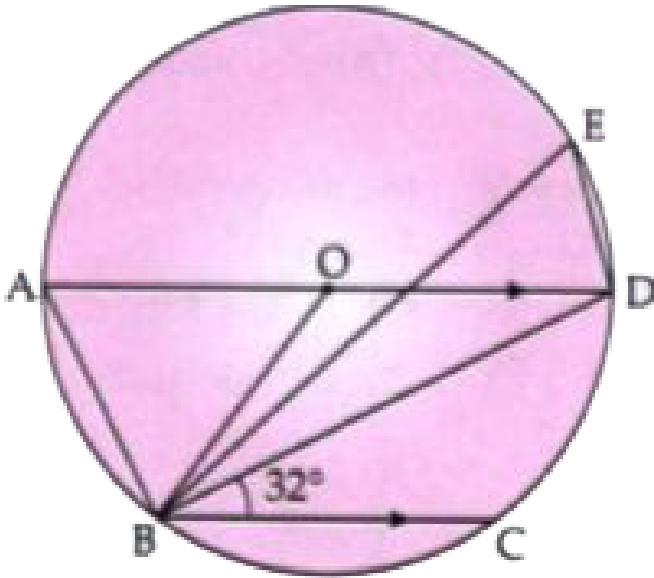
where  $R$  is a set of real numbers.



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9. In the figure given below,  $AD$  is a diameter.  $O$  is the centre of the circle.  $AD$  is parallel to  $BC$  and  $\angle CBD = 32^\circ$ . Find : (i)

$\angle OBD$  (ii)  $\angle AOB$  (iii)  $\angle BED$



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10. If  $(3a + 2b) : (5a + 3b) = 18 : 29$ . Find  $a : b$ .

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**11.** A game of numbers has cards marked with 11, 12, 13, ....., 40. A card is drawn at random. Find the probability that the number on the card drawn is :

(i) A perfect square



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**12.** A game of numbers has cards marked with 11, 12, 13, ....., 40. A card is drawn at random. Find the probability that the number on the card drawn is :

(ii) Divisible by 7



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**13.** Use graph paper for this question.

(Take 2 cm = 1 unit along both x-axis and y-axis.)

Plot the points  $O(0, 0)$ ,  $A(-4, 4)$ ,  $B(-3, 0)$  and  $C(0, -3)$

Reflect points  $A$  and  $B$  on the  $y$ -axis and name them  $A'$  and  $B'$  respectively. Write down their co-ordinates.

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**14.** Use graph paper for this question.

(Take 2 cm = 1 unit along both x-axis and y-axis.)

Plot the points  $O(0, 0)$ ,  $A(-4, 4)$ ,  $B(-3, 0)$  and  $C(0, -3)$  .

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**15.** Use graph paper for this question.

(Take 2 cm = 1 unit along both x-axis and y-axis.)

Plot the points  $O(0, 0)$ ,  $A(-4, 4)$ ,  $B(-3, 0)$  and  $C(0, -3)$

State the line of symmetry of this figure.



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**16.** A person invests Rs. 5,000 for two years at a certain rate of interest compound annually. At the end of one year, this sum amounts to Rs. 5,600. Calculate.

(i) the rate of interest per annum.

(ii) the amount at the end of the second year.



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1. Solve the given quadratic equation,  $x^2 - 3(x + 3) = 0$ , giving your answer correct to two significant figures.

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2. A page from the savings bank account of Mrs. Ravi is given below.

Date	Particulars	Withdrawal (₹)	Deposit (₹)	Balance (₹)
April 3rd, 2006	B/F			6000
April 7th	By Cash		2300	8300
April 15th	By Cheque		3500	11800
May 20th	To Self	4200		7600
June 10th	By Cash		5800	13400
June 15th	To Self	3100		10300
August 13th	By Cheque		1000	11300
August 25th	To Self	7400		3900
September 6th 2006	By Cash		2000	5900

She closed the account on 30th September, 2006.

Calculate the interest Mrs. Ravi earned at the end of 30th September, 2006 at 4.5% per annum interest.

Hence, find the amount she receives on closing the account.



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3. In what time will Rs 1500 yield Rs 1996.50 as compound interest at 10% per annum compounded annually ?



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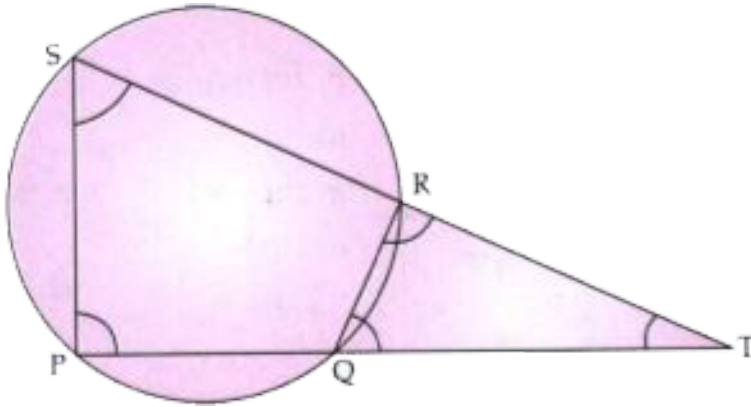
4. Draw a regular hexagon of side 5 cm.



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5. In the given figure PQRS is a cyclic quadrilateral PQ and SR produced meet at T.

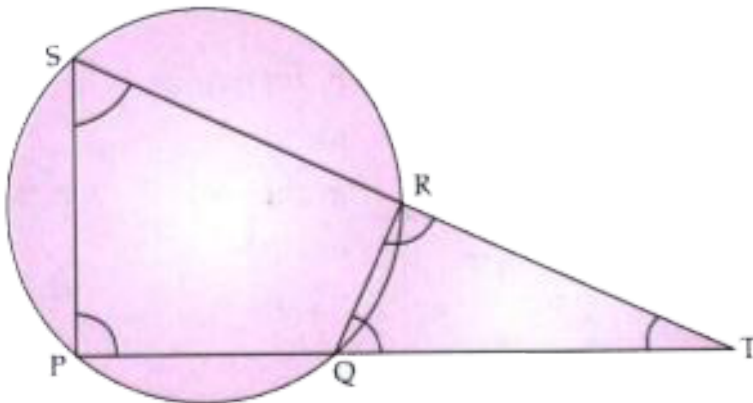
(i) Prove  $\Delta TPS \sim \Delta TRQ$ .



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6. In the given figure PQRS is a cyclic quadrilateral PQ and SR produced meet at T.

(ii) Find SP if  $TP = 18$  cm,  $RQ = 4$  cm and  $TR = 6$  cm.

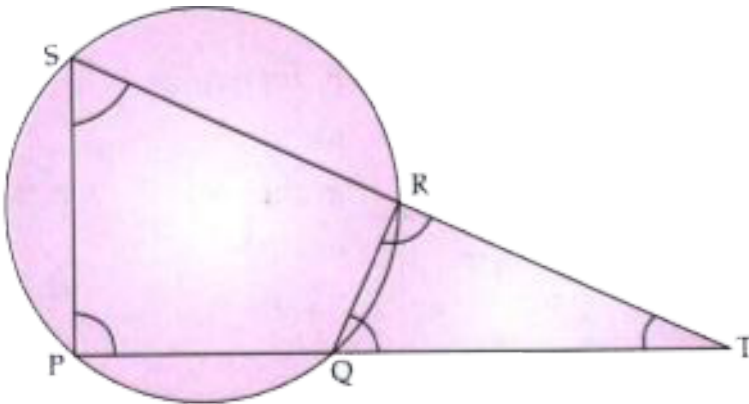




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7. In the given figure PQRS is a cyclic quadrilateral PQ and SR produced meet at T. If  $SP=12\text{cm}$  and  $QR=4\text{cm}$ ,

(iii) Find area of quadrilateral PQRS if area of  $\Delta PTS = 27\text{cm}^2$ .



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8. Given matrix

$$A = [(, 4\sin 30^\circ \cos 0^\circ)(, \cos 0^\circ 4\sin 30^\circ)] \text{ and } B = \begin{bmatrix} 4 \\ 5 \end{bmatrix}.$$

If  $AX=B$ .

write the order of matrix  $X$ .



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9.

Given

matrix

$$A = [(, 4\sin 30^\circ \cos 0^\circ)(, \cos 0^\circ 4\sin 30^\circ)] \text{ and } B = \begin{bmatrix} 4 \\ 5 \end{bmatrix}.$$

If  $AX=B$ .

write the order of matrix  $X$ .



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10. An aeroplane at an altitude of 1500 meters finds that two ships are sailing towards it in the same direction. The angles of depression as observed from the aeroplane are  $45^\circ$  and  $30^\circ$  respectively. Find the distance between the two ships.



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11. The table shows the distribution of the scores obtained by 160 shooters in a shooting competition. Use a graph sheet and draw an ogive for the distribution. (Take 2 cm = 10 scores on the X-axis and 2 cm = 20 shooters on the Y-axis)

Score	No. of Shooters
0-10	9
10-20	13
20-30	20
30-40	26
40-50	30
50-60	22
60-70	15
70-80	10
80-90	8
90-100	7

Use your graph to estimate the following :

(i) The median.

(ii) The interquartile range.

(iii) The number of shooters who obtained a score of more than 85%.

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12. If  $\frac{x}{a} = \frac{y}{b} = \frac{z}{c}$  show that  $\frac{x^3}{a^3} + \frac{y^3}{b^3} + \frac{z^3}{c^3} = \frac{3xyz}{abc}$

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13. Draw a line  $AB = 5$  cm. Mark a point  $C$  on  $AB$  such that  $AC = 3$  cm. Using a ruler and a compass only, construct a circle of radius 2.5 cm passing through  $A$  AND  $C$ .

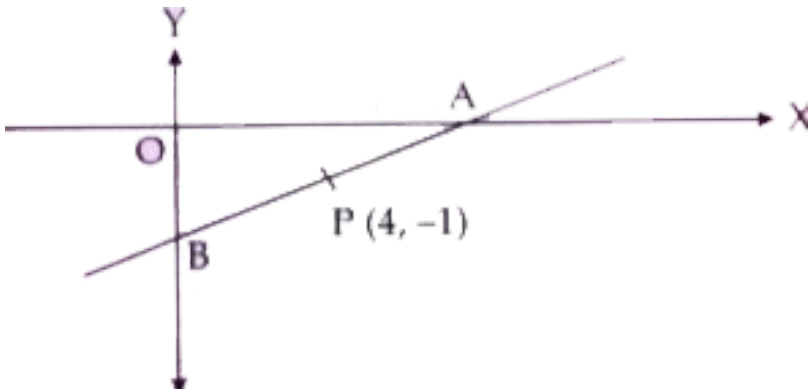
construct two tangents to the circle from the external point  $B$ .

Measure and record the length of the tangents.

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14. A line AB meets X-axis at A and Y-axis at B. P(4, -1) divides AB in the ratio 1 : 2.

(i) Find the coordinates of A and B.



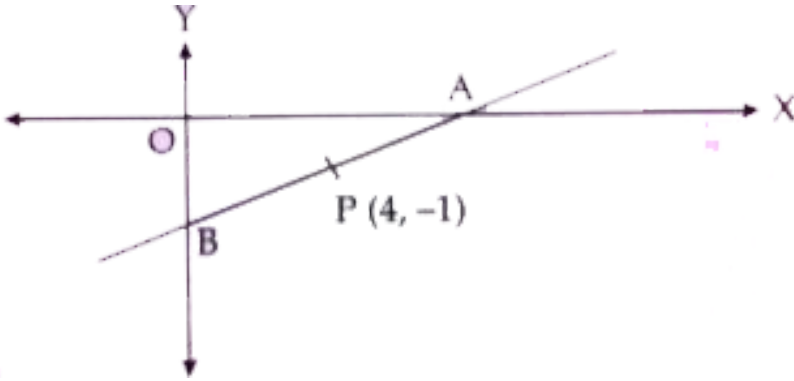
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15. A line AB meets X-axis at A and Y-axis at B. P(4, -1) divides AB in the ratio 1 : 2.

(ii) Find the equation of the line through P and perpendicular



to AB



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**16.** A dealer buys an article at a discount of 30% from the wholesaler, the marked price being Rs 6,000. The dealer sells it to a shopkeeper at a discount of 10% on the marked price. If the rate of VAT is 6% find.

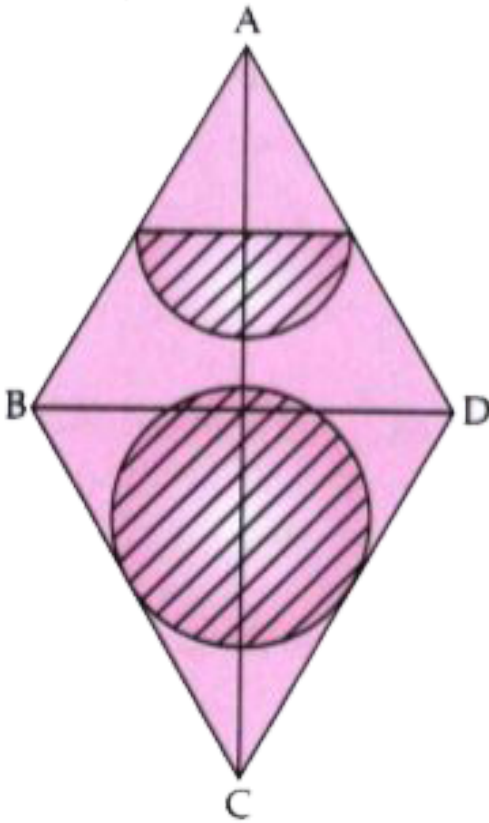
- (i) The price paid by the shopkeeper including the tax.
- (ii) The VAT paid by the dealer.

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17. The given figure represents a kite with a circular and a semicircular motifs stuck on it. The radius of circle is 2.5 cm and the semicircle is 2 cm. If diagonal AC and BD are of lengths 12 cm and 8 cm respectively, find the area of the :

(i) shaded part. Give your answer correct to the nearest whole number.

(ii) unshaded part.



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**18.** A model of a ship is made to a scale 1 : 300.

The length of the model of the ship is 2 m. Calculate the length of the ship.



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**19.** A model of a ship is made to a scale 1 : 300.

The area of the deck of the ship is  $180,000m^2$ . Calculate the area of the deck of the model.



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**20.** A model of a ship is made to a scale 1 : 300.

The volume of the model is  $6.5m^3$ . Calculate the volume of the ship.



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**21.** Mohan has a recurring deposit account in a bank for 2 years at 6% p.a. simple interest. If he gets Rs 1200 as interest at the time of maturity, find :

(i) the monthly instalment



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**22.** Mohan has a recurring deposit account in a bank for 2 years at 6% p.a. simple interest. If he gets Rs 1200 as interest at the time of maturity, find :

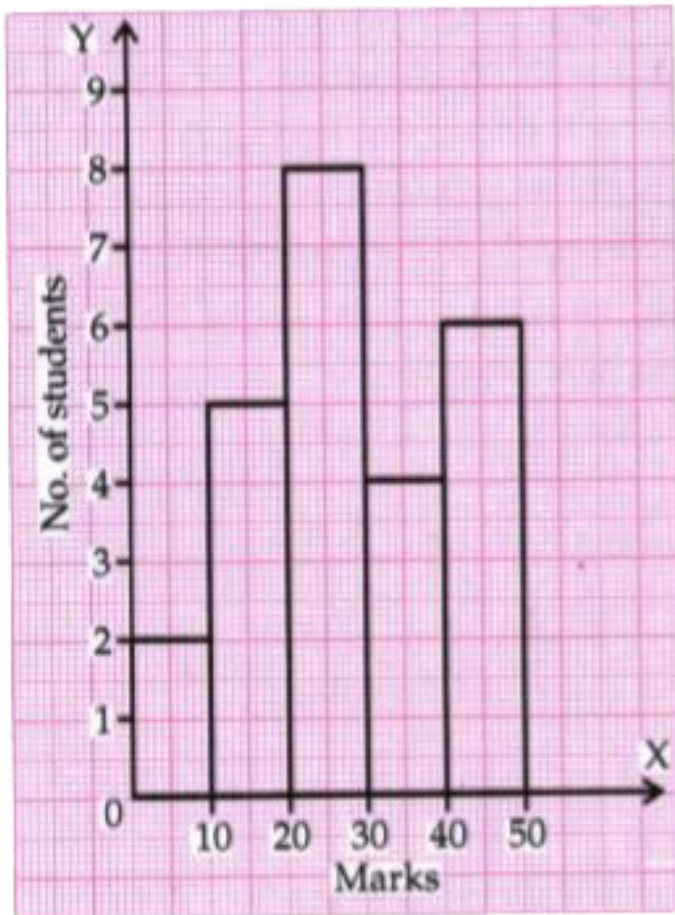
(ii) the amount of maturity.



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23. The histogram below represents the scores obtained by 25 students in a Mathematics mental test. Use the data to :

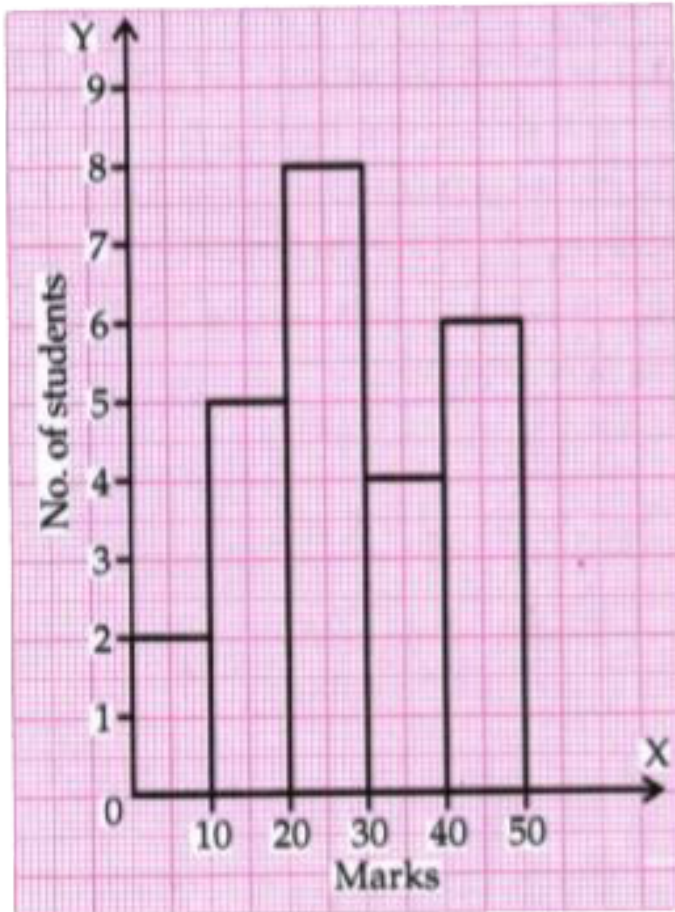
(i) Frame a frequency distribution table.



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24. The histogram below represents the scores obtained by 25 students in a Mathematics mental test. Use the data to :

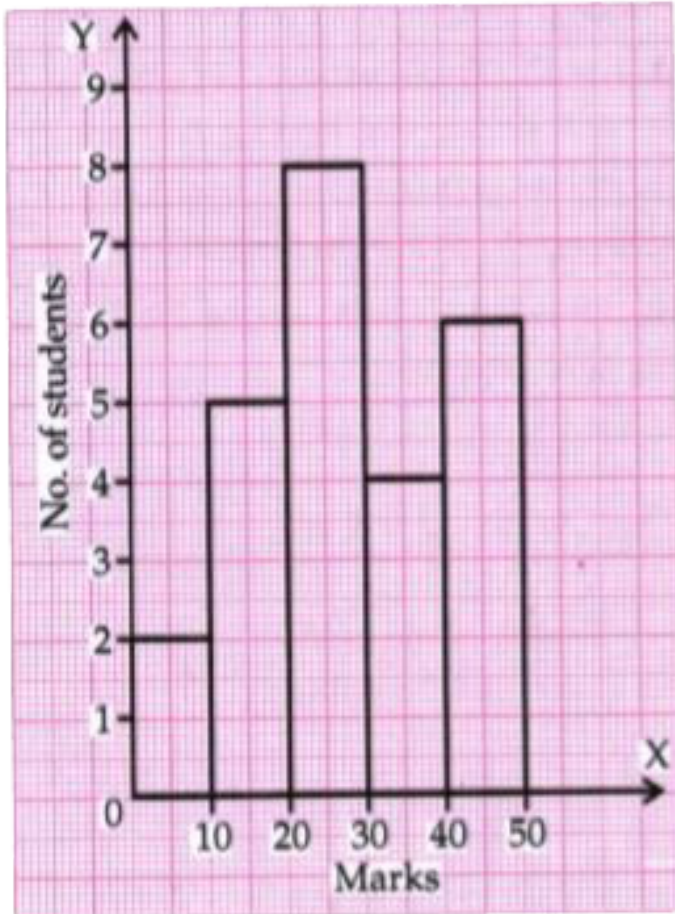
(ii) to calculate mean.



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25. The histogram below represents the scores obtained by 25 students in a Mathematics mental test. Use the data to :

(iii) To determine the Modal class.



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**26.** A bus covers a distance of 240 km at a uniform speed. Due to heavy rain its speed gets reduced by 10 km/h and as such it takes two hrs longer to cover the total distance. Assuming the uniform speed to be 'x' km/h, form an equation and solve it to evaluate 'x'.



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**27.** Prove that  $\frac{\cos A}{1 + \sin A} + \tan A = \sec A$



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**28.** Use ruler and compasses only for the following question. All construction lines and arcs must be clearly shown.

Construct a  $\triangle ABC$  in which  $BC = 6.5$  cm,  $\angle ABC = 60^\circ$ ,  $AB = 5$  cm.



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**29.** Ashok invested  $26400rs$  in  $12\%$  ,  $25rs$  shares of a company.

If he receives a dividend of  $2475rs$  find the

- (i) number of shares he bought
- (ii) market value of each share.



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**30.** Ashok invested  $26400rs$  in  $12\%$  ,  $25rs$  shares of a company.

If he receives a dividend of  $2475rs$  find the

- (i) number of shares he bought
- (ii) market value of each share.



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