MATHS

BOOKS - SELINA MATHS (ENGLISH)

MATHEMATICS-2012

Section A

1. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find $A^2 - 5A + 7I$.

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2. The monthly pocket money of Ravi and Sanjeev are in the ratio $5:7$. Their expenditures are in the ratio $3:5$. If each saves Rs 80 every month, find their monthly pocket money.

3. Using the Remainder Theorem, factorise each of the following completely:

(i) $3x^3 + 2x^2 - 19x + 6$

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

(iii) $3x^3 + 2x^2 - 23x - 30$
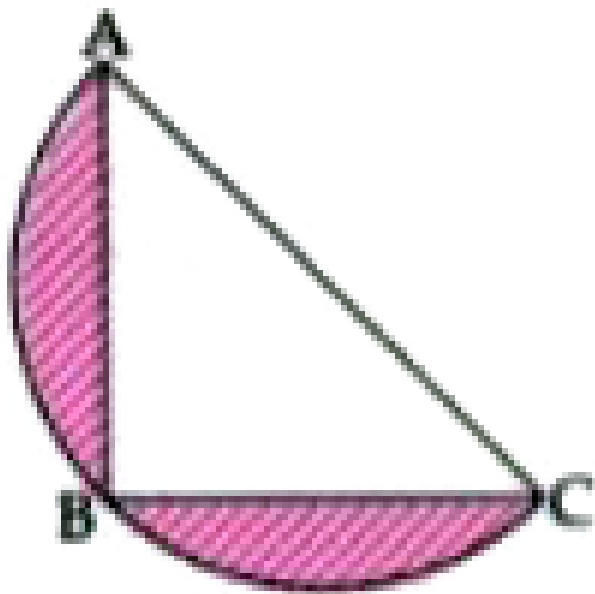
(iv) $4x^3 + 7x^2 - 36x - 63$

(v) $x^3 + x^2 - 4x - 4$

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4. On what sum of money will the difference between simple intersect and compound intersect for 2 years at 5% per annum be equal to Rs 25 ?

5. ABC is an isosceles right angled triangle with $\angle ABC = 90°$. A semi-circle is drawn with AC as the diameter. If AB = BC = 7 cm, find the area of the shaded region. (Take $\pi = \dfrac{22}{7}$)

6. Given a line segment AB joining the points A (-4, 6) and B (8, -3). Find :

(i) the ratio in which AB is dividend by the Y-axis.

7. Given a line segment AB joining the points A (-4, 6) and B (8, -3). Find :

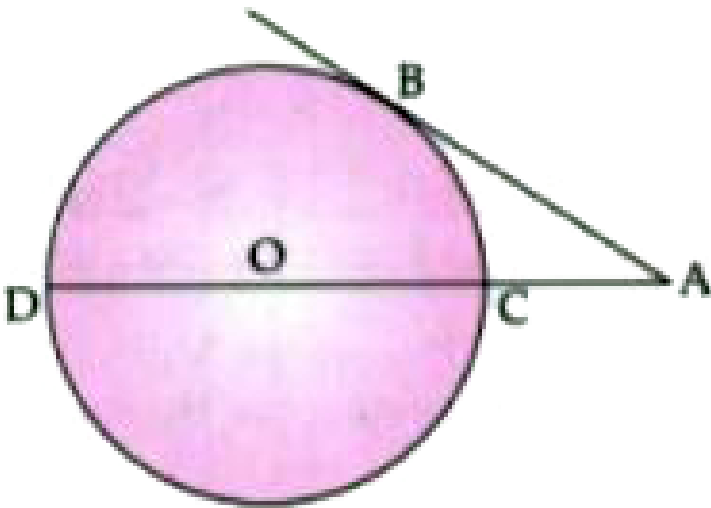(ii) find the coordinates of the point of intersection. Divided by y-axis.

8. Given a line segment AB joining the points A (-4, 6) and B (8, -3). Find :

(iii) the length of AB.

9. In the given figure O is the centre of the circle and AB is a tangents at B. If AB = 15 cm and AC = 7.5 cm. Calculate the radius of the circle.

10. Evaluate without using trigonometric tables :

$$\cos^2 26^\circ + \cos 64^\circ \sin 26^\circ + \frac{\tan 36^\circ}{\cot 54^\circ}$$

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11. Marks obtained by 40 students in a short asssessment is given below, where a and b are two missing data.

Marks	5	6	7	8	9
No. of Students	6	a	16	13	b

If the mean of the distribution is 7.2, find a and b.

12. Kiran deposited Rs 200 per month for 36 months in a bank's recurring deposit account. If the bank pays interest at the rate of 11% per annum, find the amount she gets on maturity.

13. Two coins are tossed once. Find the probability of getting :

(i) 2 heads, (ii) at least 1 tail.

14. Using graph paper and taking 1 cm = 1 unit along both X-axis and Y-axis.

(i) Plot the points A (-4, 4) and B (2, 2).

15. Using graph paper and taking 1 cm = 1 unit along both X-axis and Y-axis.

(ii) Reflect A and B in the origin to get the image A' and B' respectively.the points A (-4, 4) and B (2, 2)

16. Using graph paper and taking 1 cm = 1 unit along both X-axis and Y-axis.

(iii) Write down the coordinates of A' and B'

Reflect A and B in the origin to get the image

A' and B' respectively.the points A (-4, 4) and B (2, 2)

17. Using graph paper and taking 1 cm = 1 unit along both X-axis and Y-axis.

(iv) Give the geometrical name for the figure ABA'B'. the points A (-4, 4) and B (2, 2)the points A (-4, 4) and B (2, 2)Reflect A and B in the origin to get the image A' and B' respectively.

18. Using graph paper and taking 1 cm = 1 unit along both X-axis and Y-axis.
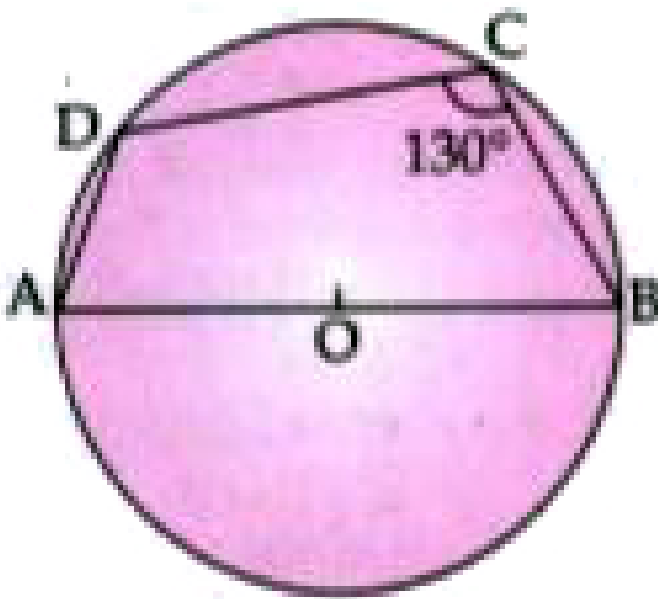
(iv) Give the geometrical name for the figure ABA'B'. the points A (-4, 4) and B (2, 2)the points A (-4, 4) and B (2, 2)Reflect A and B in the origin to get the image A' and B' respectively.

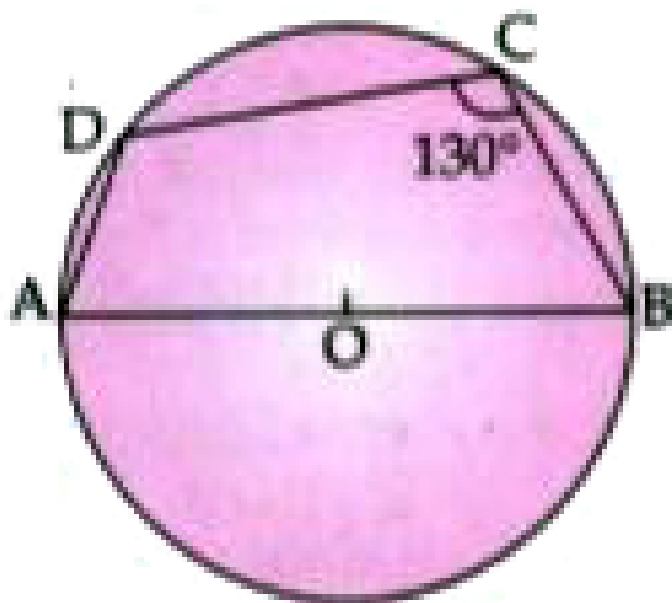**1.** In the given figure, AB is the diameter of a circle with centre O.

$\angle BCD = 130°$. Find

(i) $\angle DAB$

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2. In the given figure, AB is the diameter of a circle with centre O.

$\angle BCD = 130°$. Find

(ii) $\angle DBA$

3. Given $\begin{bmatrix} 2 & 1 \\ -3 & 4 \end{bmatrix} . X = \begin{bmatrix} 7 \\ 6 \end{bmatrix}$. Write :

(i) the order of the matrix X.

(ii) the matrix X.

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4. Given $\begin{bmatrix} 2 & 1 \\ -3 & 4 \end{bmatrix} . X = \begin{bmatrix} 7 \\ 6 \end{bmatrix}$. Write :

(i) the order of the matrix X.

(ii) the matrix X.

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5. A page from the Saving Bank Account of Mr. Prateek is given below :

Date	Particulars	Withdrawal (in ₹)	Deposit (in ₹)	Balances (in ₹)
January 1st 2006	B/F	—	—	1,270
January 7th 2006	By Cheque	—	2,310	3,580
March 9th 2006	To Self	2,000	—	1,580
March 26th 2006	By Cash	—	6,200	7,780
June 10th 2006	To Cheque	4,500	—	3,280
July 15th 2006	By Clearing	—	2,630	5,910
October 18th 2006	To Cheque	530	—	5,380
October 27th 2006	To Self	2,690	—	2,690
November 3rd 2006	By Cash	—	1,500	4,190
December 6th 2006	To Cheque	950	—	3,240
December 23rd 2006	By Transfer	—	2,920	6,160

If the receives Rs 198 as interest on 1st January, 2007, find the rate of interest paid by the bank.

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6. The printed price of an article is Rs 60,000. The wholsaler allows a discount of 20% to the shopkeeper. The shopkeeper sells the article to the customer at the printed price. Sales tax (under VAT) is charged at the rate of 6% at every stage. Find :

(i) the cost to the shopkeeper inclusive of tax.

(ii) VAT paid by the shopkeeper to the Government.

(iii) the cost to the customer inclusive of tax.

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7. Solve the following inequation and represent the solution set on the number line :

$$4x - 19 < \frac{3x}{5} - 2 \leq \frac{-2}{5} + x, \ \in R$$

8. Without solving the following quadratic equation, find the value of 'm' for which the given equation has real and equal roots.

$$x^2 + 2(m - 1)x + (m + 5) = 0$$

9. A hollow sphere of internal and external radii 6 cm and 8 cm respectively is melted and recast into small cones of base radius 2 cm and height 8 cm. Find the number of cones.

10. Solve the following equation and give your answer correct to 3 significant figures :

$$5x^2 - 3x - 4 = 0$$

11. As observed from the top of a 80 m tall lighthouse, the angle 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. Given your answer correct to the nearest metre

12. A man invests Rs 9600 on 100 shares at Rs 80. If the company pays him 18% dividend find :

the number of shares he buys.

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13. A man invests Rs 9600 on Rs 100 shares at Rs 80. If the company pays him 18% dividend find :

(ii) his total dividend.

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14. A man invests Rs 9600 on Rs 100 shares at Rs 80. If the company pays him 18% dividend find :
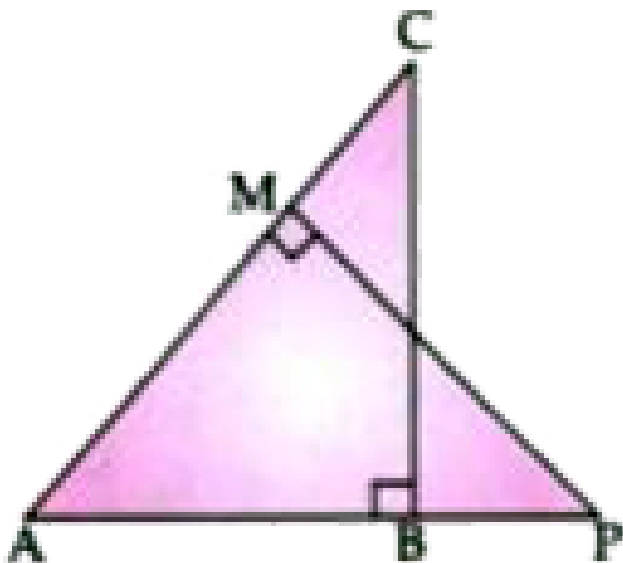
(iii) his percentage return on the shares.

15. In the given figure $\triangle ABC$ and $\triangle AMP$ are right angled at B and M respectively.

Given AC = 10 cm, AP = 15 cm and PM = 12 cm.

(i) Prove $\triangle ABC \sim \triangle AMP$.

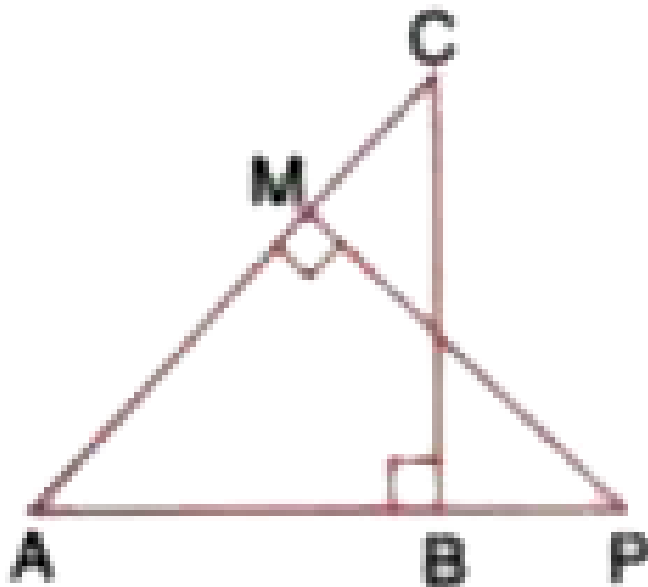**16.** In the given figure, $\triangle ABC$ and $\triangle AMP$ are right angled at B and M respectively.

Given

$AC = 10cm$, $AP = 15cm$ and $PM = 12cm$.

Find : AB and BC.

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17. If $x = \dfrac{\sqrt{a+1} + \sqrt{a-1}}{\sqrt{a+1} - \sqrt{a-1}}$, using properties of proportion show that

$$x^2 - 2ax + 1 = 0$$

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18. The line through A (-2, 3) and B (4, b) is perpendicular to the line $2x - 4y = 5$. Find the value of b.

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19. Prove that $\dfrac{\tan^2\theta}{(\sec\theta - 1)^2} = \dfrac{1 + \cos\theta}{1 - \cos\theta}$.

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20. A car covers a distance of 400 km at a certain speed. Had the speed been 12 km/h more, the time taken for the journey would have been 1 hour 40 minutes less. Find the original speed of the car.

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21. The following distribution represents the height of 160 students of a school.

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

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

(i) The median height.

22. The following distribution represents the height of 160 students of a school.

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

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175–180	8

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

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24. In triangle PQR, PQ = 24 cm, QR = 7 cm and $\angle PQR = 90°$. Find the radius of the

inscribed circle.
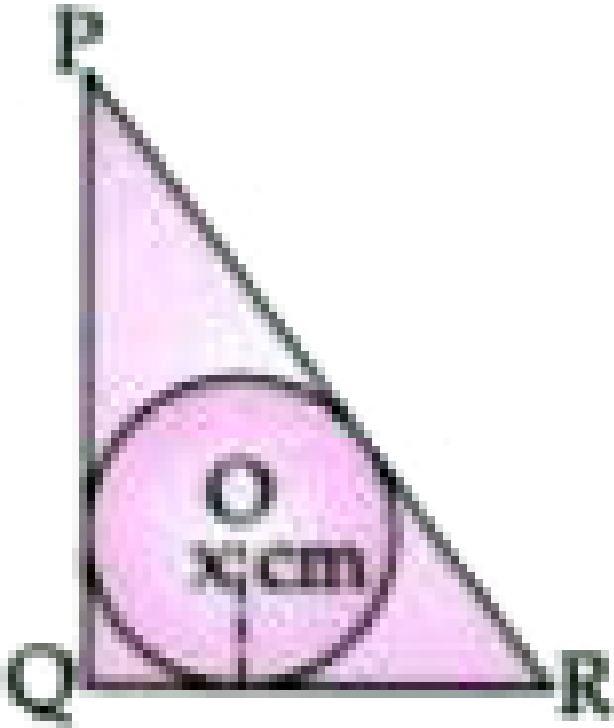
25. Find the mode and median of the following frequency distribution :

x	10	11	12	13	14	15
f	1	4	7	5	9	3

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26. In the given figure, The line through P (5, 3) intersects Y-axis at Q.
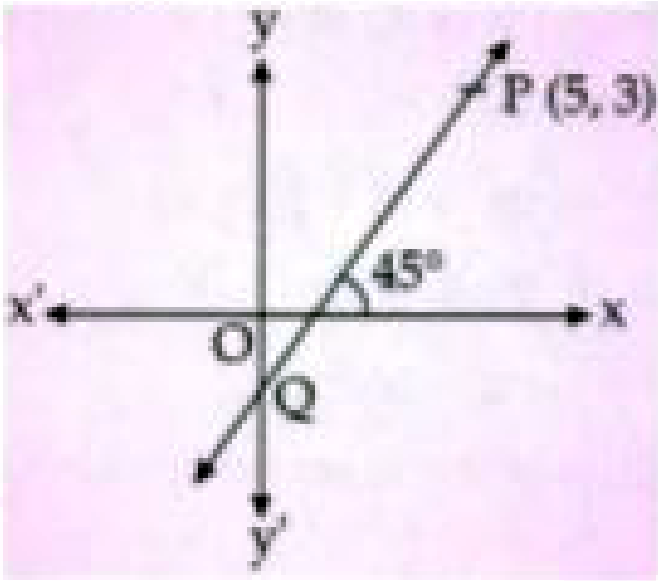
Write the slope of the line.

27. The line through P (5, 3) intersects Y-axis at

Q.
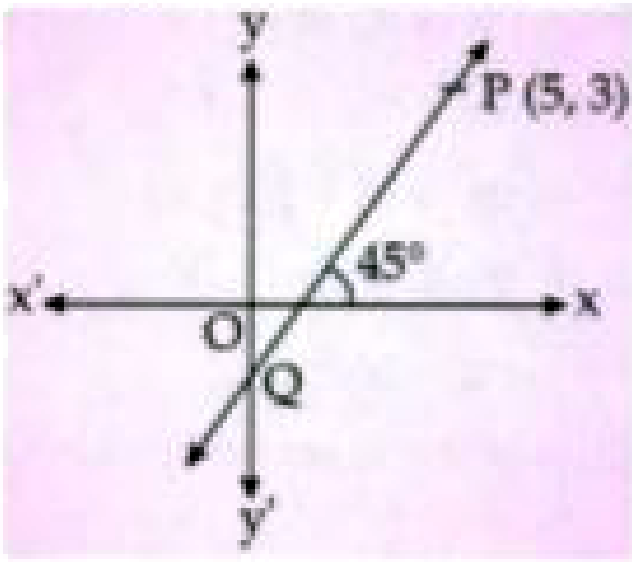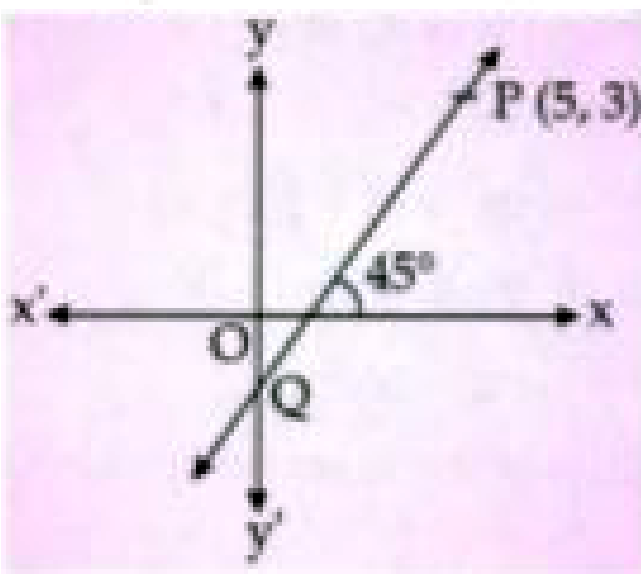
Write the equation of the line.

28. In the given figure , The line through P (5, 3) intersects Y-axis at Q.

Find the coordinates of Q.

Find the coordinates of Q.

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