MATHS

BOOKS - SELINA MATHS (ENGLISH)

MATHEMATICS-2013

Section A

1. Given

$$A = \begin{bmatrix} 2 & -6 \\ 2 & 0 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix} \text{ and } C = \begin{bmatrix} 4 & 0 \\ 0 & 2 \end{bmatrix}$$

. Find the matrix X such that A+2X=2B+C.

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2. At what rate per cent will a sum of Rs 4,000 yield 1,324 as compound interest in 3 years?

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3. The median of the following observation 11, 12, 14, (x - 2), (x + 4), (x + 9), 32, 38, 47 arranged in ascending order is 24. Find the value of x and hence find the mean.

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4. What number must be added to each of the numbers 6, 15, 20 and 43 to make them proportional ?

5. If x-2 is a factor of the expression $2x^3 + ax^2 + bx - 14$ and when the expression is divided by (x -3), it leaves a remainder 52, find the values of a and b.

6. Draw a histogram for the following frequency distribution and find the mode from the graph :

Class	0-5	5-10	10-15	15-20	20-25	25-30
Frequency	2	5	18	14	8	5

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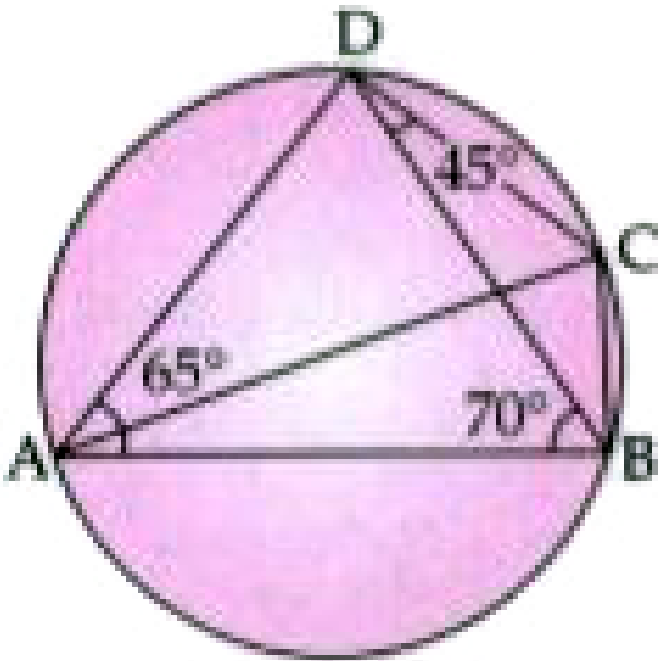**7.** Evaluate :

$$3\cos 80^\circ \cos ec10^\circ + 2\sin 59^\circ \sec 31^\circ$$

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8. In the given figue,

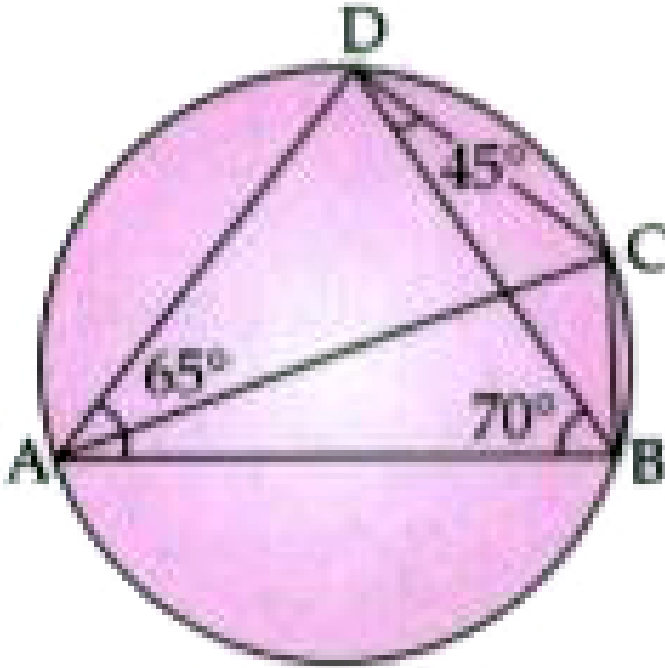$\Rightarrow \angle BAD = 65° \angle ABD = 70°, \angle BDC = 45°.$

(ii) Find $\angle ACB$

9. In the given figue,

$\Rightarrow \angle BAD = 65° \angle ABD = 70°, \angle = 45°.$

(i) Prove that AC is a diameter of the circle.

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10. AB is a diameter of a circle with centre C = (-2, 5). If

A = (3, -7). Find

the length of radius AC

11. AB is a diameter of a circle with centre C = (-2, 5). If

A = (3, -7). Find

the coordinates of B.

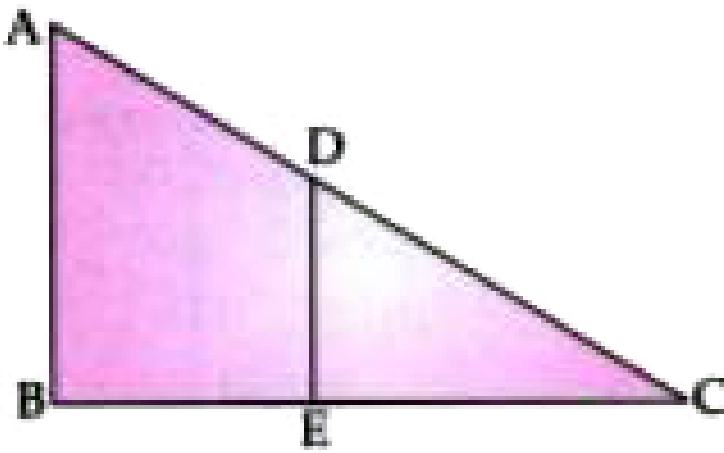**12.** Solve the following equation and calculate the answer correct to two decimal places :

$x^2 - 5x - 10 = 0.$

13. In the given figure, AB and DE are perpendicular to BC.

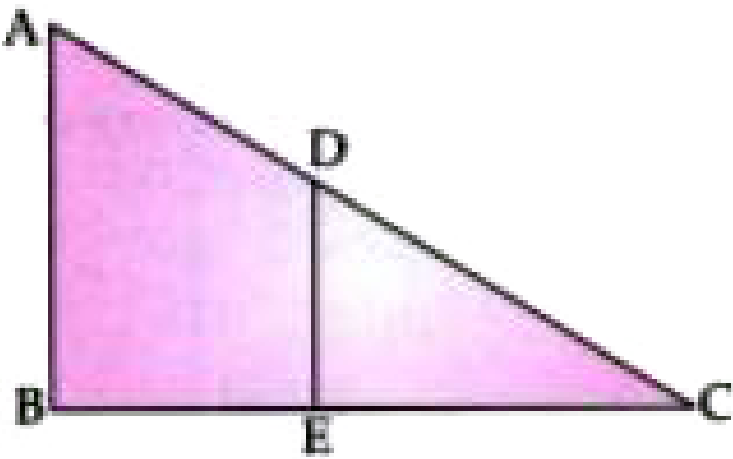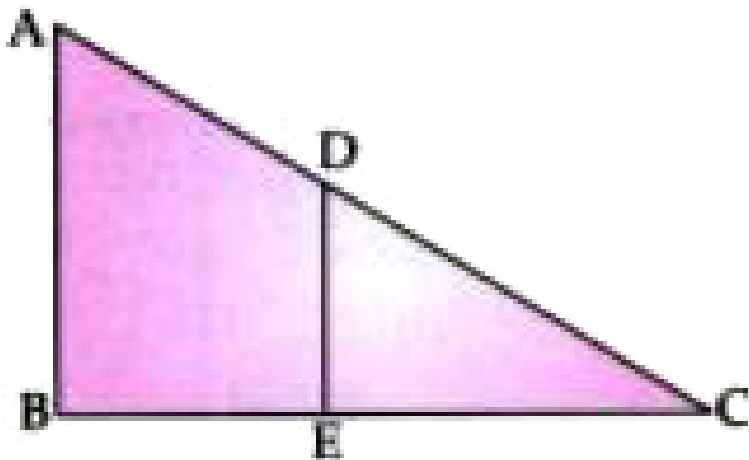(i) Prove that $\triangle ABC \sim \triangle DEC$

14. In the given figure, AB and DE are perpendicular to BC.

(il) If AB = 6 cm, DE = 4 cm and AC = 15 cm. Calculate CD.

15. In the given figure, AB and DE are perpendicular to BC. If AB = 6cm, DE = 4cm and AC = 15cm.

(iii) Find the ratio of the area of $\triangle ABC$: area of $\triangle DEC$.

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16. Using a graph paper, plot the points A (6, 4)and B(0, 4).

Reflect A and B in the origin to get the images A and B'.

17. Using a graph paper, plot the points A (6, 4)and

B(0, 4).

Write the co-ordinates of A' and B'.

18. Using a graph paper, plot the points A (6, 4)and

B(0, 4).

State the geometrical name for the figure ABA'B'.

19. Using a graph paper, plot the points A (6, 4)and

B(0, 4).

Find its perimeter.

Section B

1. Solve the following inequation, write the solution

set and represent it on the number line :

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

2. Mr. Britto 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. Britto gets Rs 8,088 from the bank after 3 years, find the value of his monthly instalment.

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3. Salman buys 50 shares of face value $100rs$ available at $132rs$

(i) What is his investment ?

(ii) If the dividend is 7.5% what will be his annual income ?

(iii) If he wants to increase his annual income by $150rs$ how many extra shares should be buy ?

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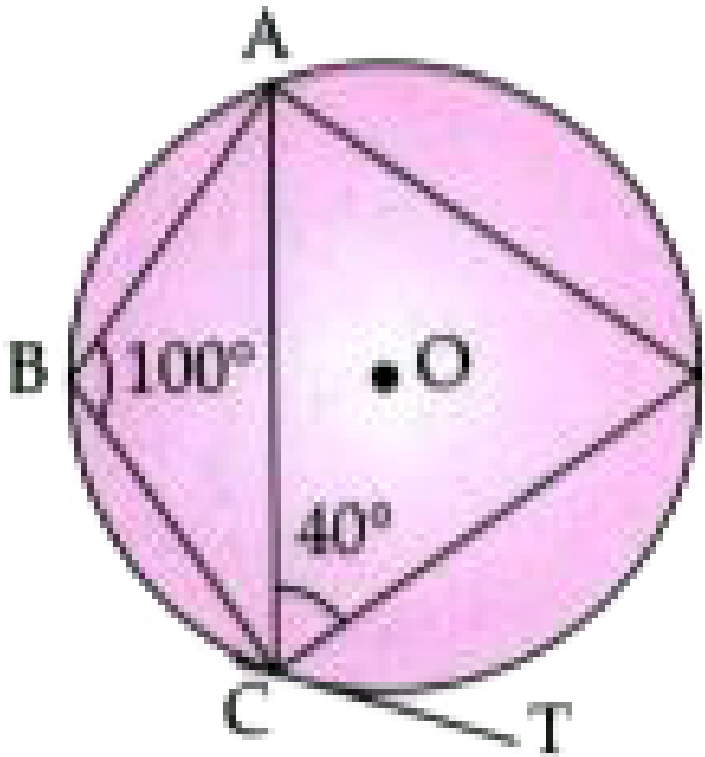(iii) If he wants to increase his annual income by $150rs$ how many extra shares should be buy ?

6. Show that,

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

7. In the given circle with centre O, $\angle ABC = 100°$, $\angle ACD = 40°$ and CT is a tangent to the circle at C. Find the $\angle ADC$ and $\angle DCT$.

8. Given below are the entries in a Saving Bank A/c pass book :

Date	Particulars	Withdrawals	Deposit	Balance
Feb. 8	B/F	—	—	₹ 8,500
Feb. 18	To Self	₹ 4,000	—	—
April 12	By Cash	—	₹ 2,230	—
June 15	To Self	₹ 5,000	—	—
July 8	By Cash	—	₹ 6,000	—

Calculate the interest for six montghs from February to July at 6% p.a.

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9. In $\triangle ABC$, A (3, 5), B (7, 8) and C(1, -10). Find the equation of the median through A.

10. A shopkeeper sells an article at the listed price of Rs 1,500 and the VAT is 12% at each stage of sale. If the shopkeeper pays a VAT of Rs 36 to the Government, what was the price, inclusive of Tax, at which the shopkeeper purchased the article from the wholesaler ?
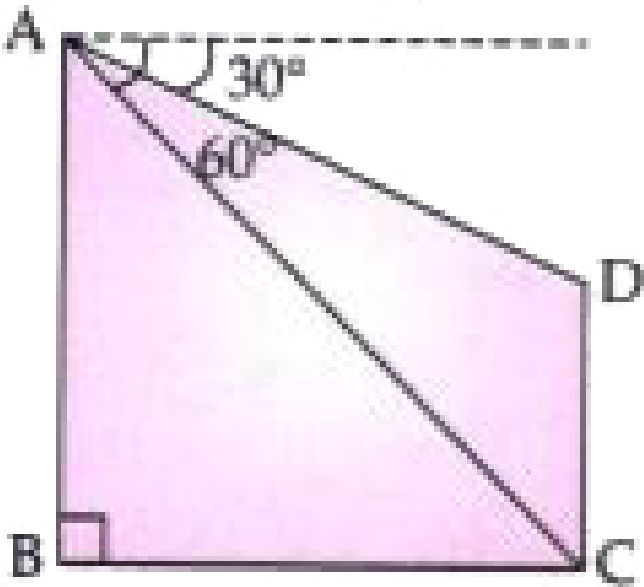
11. In the igure given, from the top of a building AB = 60 m high, the angles of depression of the top and

bottom of a vertical lamp post CD are observed to be $30°$ and $60°$ respectively. Find :

(i) the horizontal distance between AB and CD.

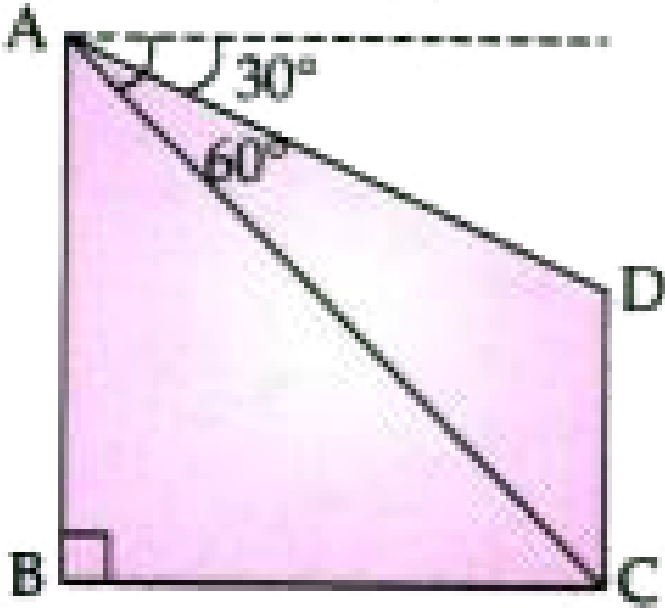**12.** In the figure given, from the top of a building AB = 60 m high, the angles of depression of the top and

bottom of a vertical lamp post CD are observed to be $30°$ and $60°$ respectively. Find :

(ii) the height of the lamp post.

13. Find x and y, if : $\begin{bmatrix} x & 3x \\ y & 4y \end{bmatrix} \begin{bmatrix} 2 \\ 1 \end{bmatrix} = \begin{bmatrix} 5 \\ 12 \end{bmatrix}$

14. A solid sphere of radius 15 cm is melted and recast into solid right circular cones of radius 2.5 cm and height 8 cm. Calculate the number of cones recast.

15. Find the value of 'p'. If the following quadratic equations have equal roots :

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

(ii) $x^2 + (p-3)x + p = 0$
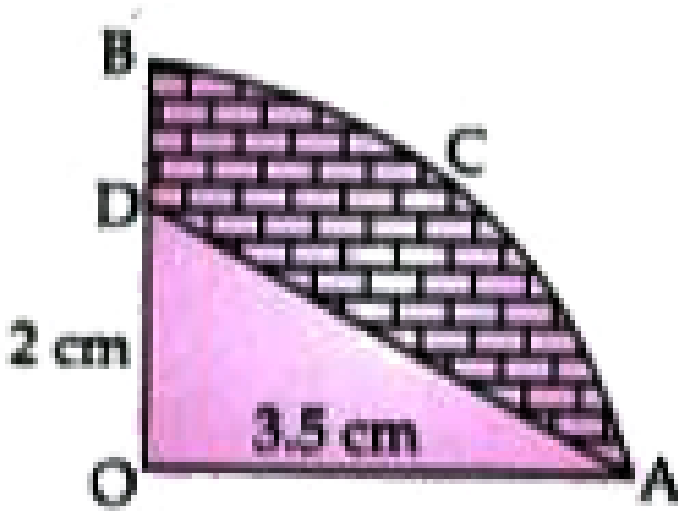
16. In the figure alongside, OAB is a quadrant of a circle. The radius OA = 3.5 cm and OD = 2 cm. Calculate the area of ther shaded portion.

(Take $\pi = \dfrac{22}{7}$)

17. A box contains some black balls and 30 white balls. If the probability of drawing a black ball is two-fifths of a white ball, find the number of black balls in the box.

18. Find the mean of the following distribution by step deviation method :

Class interval	20–30	30–40	40–50	50–60	60–70	70–80
Fre- quency	10	6	8	12	5	9

19. Using a rular and compass only :

(i) Construct a triangle ABC with the following data :

AB = 3.5 cm, BC = 6 cm and $\angle ABC = 120°$.

(ii) In the same diagram, draw a circle with BC as diameter. Find a point P on the circunference of the circle which is equidistant from AB and BC.

(iii) Measure $\angle BCP$.

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20. The marks obtained by 120 styudents in a 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	16	22	26	18	11	6	4	3

Draw an ogive for the given distribution on a graph sheet

Use suitable scale for ogive to estiamte the following :

(i) The median.

21. The marks obtained by 120 styudents in a 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	16	22	26	18	11	6	4	3

Draw an ogive for the given distribution on a graph sheet

Use suitable scale for ogive to estiamte the following

:

(i) The number of students who obtained more than 75% marks in the test.

22. The marks obtained by 120 styudents in a 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	16	22	26	18	11	6	4	3

Draw an ogive for the given distribution on a graph sheet
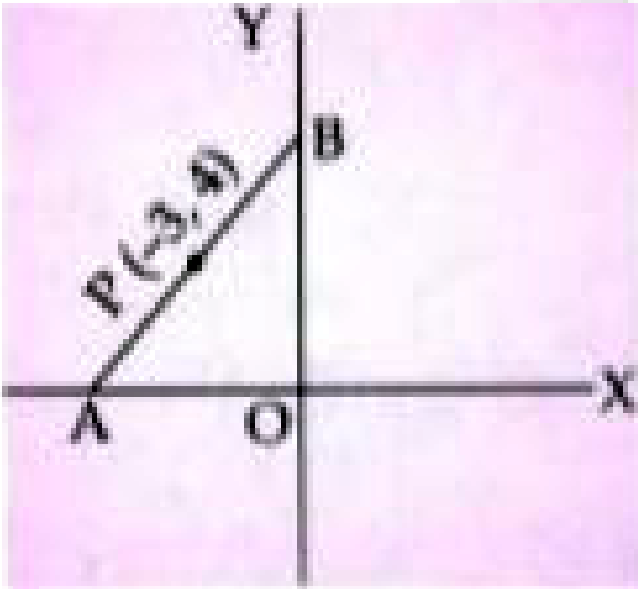
Use suitable scale for ogive to estiamte the following

:

(iii) The number of students who did not pass the test if minimum marks required to pass is 40.

23. In the figure given below , the line segment AB meets X-axis at A and Y-axis at B. The point P (-3, 4) on AB divides it in the ratio $2 : 3$. Find the coordinates of

A and B.

24. Using the properties of proportion, solve for x, given

$$\frac{x^4 + 1}{2x^2} = \frac{17}{8}.$$

25. A shopkeeper purchase a certain number of books for Rs 960. If the cost per books was Rs 8 less, the number of books that could be purchased for Rs 960 would be 4 more. Write an equation, taking the ioriginal cost of each book to be Rs x, and solve it to find ther original cost of the books.