



## MATHS

### BOOKS - SELINA MATHS (ENGLISH)

#### MATHEMATICS -2014

#### Section A

1. Ranbir borrows ₹ 20,000 at 12 per cent C.I. If he repays ₹ 8,400 at the end of first year and ₹ 9,680 at the end of second year, find the amount of loan outstanding at the beginning of the third year.



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2. Find the values of  $x$ , which satisfy the inequation  $-2\frac{5}{6} < \frac{1}{2} - \frac{2x}{3} \leq 2, x \in W$ . Graph the solution set on the number line.

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3. A die has 6 faces marked by the given numbers as shown below :



The die is thrown once. What is the probability of getting

(i) a positive integer.

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4. A die has 6 faces marked by the given numbers as shown below :



The die is thrown once. What is the probability of getting  
(ii) an integer greater than -3.

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5. A die has 6 faces marked by the given numbers as shown below :



The die is thrown once. What is the probability of getting  
(iii) the smallest integer.

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6. Find  $x, y$  if  $\begin{bmatrix} -2 & 0 \\ 3 & 1 \end{bmatrix} \begin{bmatrix} -1 \\ 2x \end{bmatrix} + \begin{bmatrix} -2 \\ 1 \end{bmatrix} = 2 \begin{bmatrix} y \\ 3 \end{bmatrix}$

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7. Shahrukh opened a Recurring Deposit Account in a bank and deposited Rs 800 per month for  $1\frac{1}{2}$  years. If he received Rs 15,084 at the time of maturity, find the rate of interest per annum.

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8. Calculate the ratio in which the line joining A (-4, 2) and B (3, 6) is divided by point P (x, 3). Also, find (i) x



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9. Calculate the ratio in which the line joining A (-4, 2) and B (3, 6) is divided by point P (x, 3). Also, find  
(ii) length of AP.



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10. Without using trigonometric tables, evaluate.

$$\sin^2 34^\circ + \sin^2 56^\circ + 2 \tan 18^\circ \tan 72^\circ - \cot^2 30^\circ$$



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**11.** Using the Remainder and Factor theorem, factorise the following polynomial :

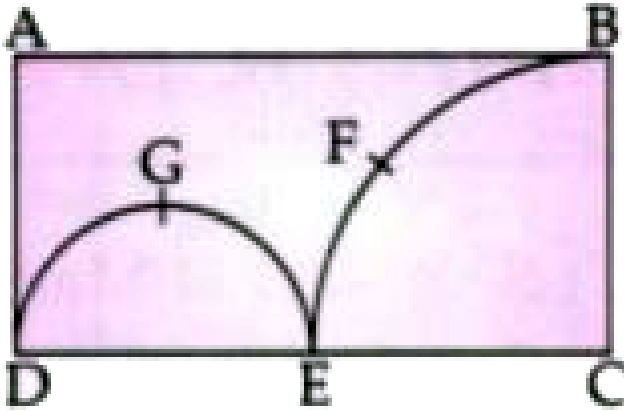
$$x^3 + 10x^2 - 37x + 26.$$



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**12.** In the figure given below, ABCD is a rectangle. AB = 14 cm, BC = 7 cm. From the rectangle, a quarter circle BFEC and a semicircle DGE are removed. Calculate the area of

the remaining piece of the rectangle. (Take  $\pi = \frac{22}{7}$ )



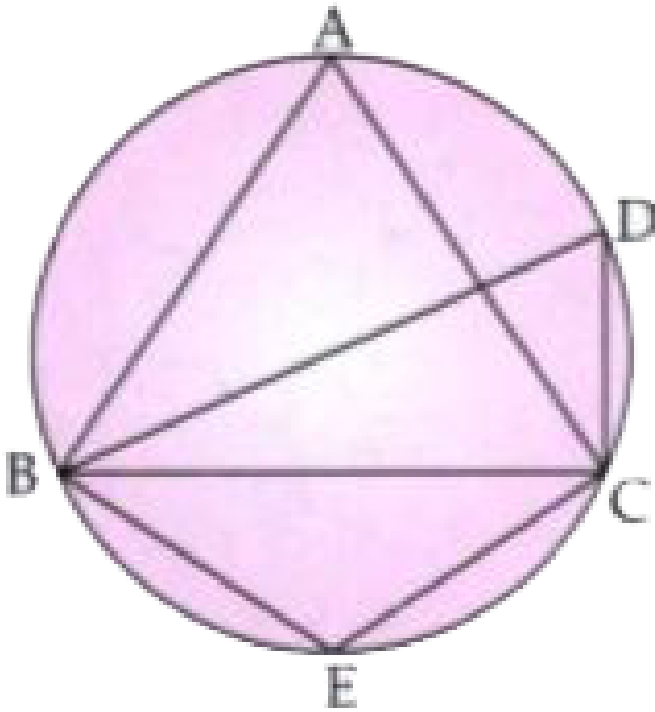
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**13.** The numbers 6, 8, 10, 12, 13, and  $x$  are arranged in an ascending order. If the mean of the observation is equal to the median, find the value of  $x$ .

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14. In the given figure,  $\angle DBC = 58^\circ$ , BD is diameter of the circle. Calculate :

(i)  $\angle BDC$  (ii)  $\angle BEC$  (iii)  $\angle BAC$



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**15.** Use graph paper to answer the following questions.

(Take 2 cm = 1 unit on both axis).

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

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**16.** Use graph paper to answer the following questions.

(Take 2 cm = 1 unit on both axis).

(ii) A' is the image of A when reflected in the Y-axis. Plot it on the graph paper and write the coordinates of A'.the points A (-4, 2) and B (2, 4).

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**17.** Use graph paper to answer the following questions.

(Take 2 cm = 1 unit on both axis).

Here  $A' (4,2)$ ,  $B' (-2,4)$  (iii)  $B'$  is the image of  $B$  when reflected in the line  $AA'$ . Write the coordinates of  $B'$ .the points  $A (-4, 2)$  and  $B (2, 4)$

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**18.** Use graph paper to answer the following questions.

(Take 2 cm = 1 unit on both axis).

(iv) Write the geometric name of the figure  $ABA'B'$ .the points  $A (-4, 2)$  and  $B (2, 4)$ ,  $A'(4,2)$ ,  $B'(2,0)$ .

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19. Use graph paper to answer the following questions.

(Take 2 cm = 1 unit on both axis).

Here  $A' (4,2)$ ,  $B' (2,0)$  (v) Name a line of symmetry of the figure formed.  $ABA'B'$ . the points  $A (-4, 2)$  and  $B (2, 4)$



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## Section B

1. A shopkeeper bought a washing machine at a discount of 20% from a wholesaler, the printed price of the washing machine being Rs 18,000. The shopkeeper sells it to a consumer at a discount of 10% on the printed price. If the rate of sales tax is 8%, find :

(i) the VAT paid by the shopkeeper,

(ii) the total amount that the consumer pays for the washing machine.

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2. If  $\frac{x^2 + y^2}{x^2 - y^2} = \frac{17}{8}$ , using the properties of proportion

find the value of :

(i)  $x : y$

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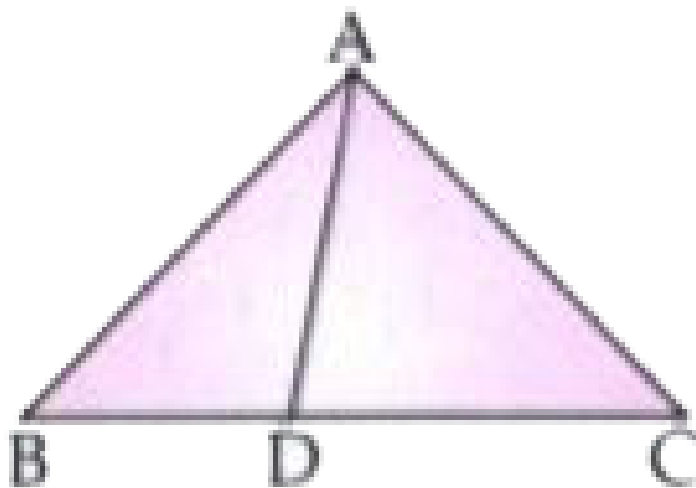
3. If  $\frac{x^2 + y^2}{x^2 - y^2} = \frac{17}{8}$ , using the properties of proportion

find the value of :

(ii)  $\frac{x^3 + y^3}{x^3 - y^3}$

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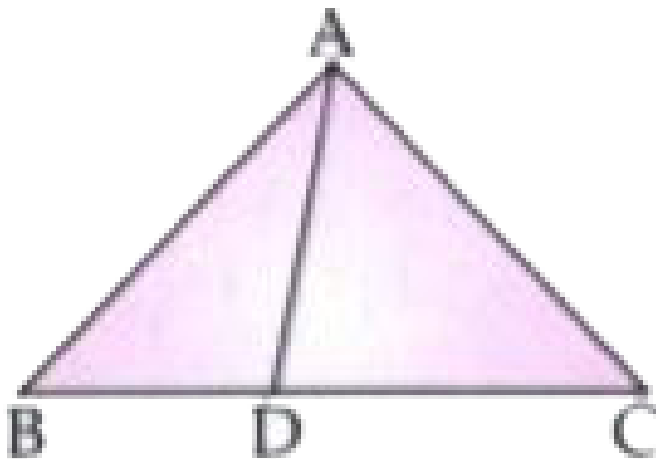
4. In  $\triangle ABC$ ,  $\angle ABC = \angle DAC$ ,  $AB = 8$  cm,  $AC = 4$  cm and  $AD = 5$  cm.



(i) Prove that  $\triangle ACD \sim \triangle BCA$ .

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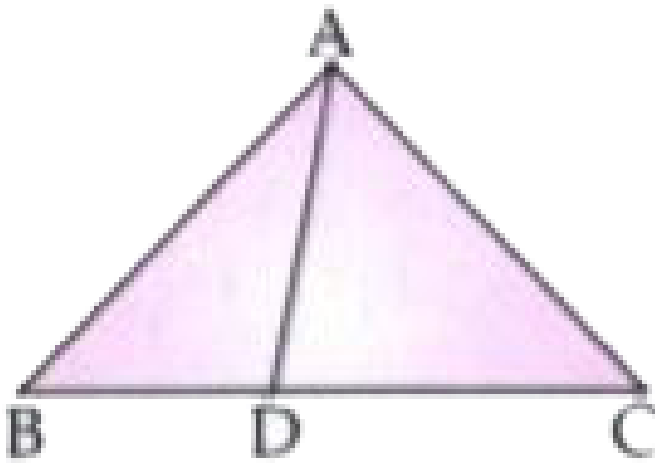
5. In  $\triangle ABC$ ,  $\angle ABC = \angle DAC$ ,  $AB = 8$  cm,  $AC = 4$  cm and  $AD = 5$  cm.



(ii) Find the length of BC and CD.

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6. In  $\triangle ABC$ ,  $\angle ABC = \angle DAC$ ,  $AB = 8$  cm,  $AC = 4$  cm and  $AD = 5$  cm.



(iii) Find area of  $\triangle ACD$  : area of  $\triangle ABC$ .

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7. Find the value of 'a' for which the following points A (a, 3), B (2, 1) and C (5, a) are collinear. Hence, find the equation of the line.

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8. Salman invests a sum of money in 50rs shares paying 15% dividend quoted at 20% premium. If his annual dividend is 600rs, calculate

(i) the number of shares he bought

(ii) his total investment

(iii) the rate of return on his investment

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9. Salman invests a sum of money in Rs 50 shares, paying 15% dividend quoted at 20% premium. If his annual dividend is Rs 600, calculate :

(ii) his total investment.

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**10.** Salman invests a sum of money in Rs 50 shares, paying 15% dividend quoted at 20% premium. If his annual dividend is Rs 600, calculate :

(iii) the rate of return on his investment.

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**11.** The surface area of a solid metallic sphere is  $2464 \text{ cm}^2$ . It is melted and recast into solid right circular cones of radius 3.5 cm and height 7 cm. Calculate :

(i) the radius of the sphere.

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12. The surface area of a solid metallic sphere is  $2464\text{cm}^2$ . It is melted and recast into solid right circular cones of radius 3.5 cm and height 7 cm. Calculate :

the number of cones recast. (Take  $\pi = \frac{22}{7}$ )

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13. Calculate the mean of the distribution given below using the short cut method.

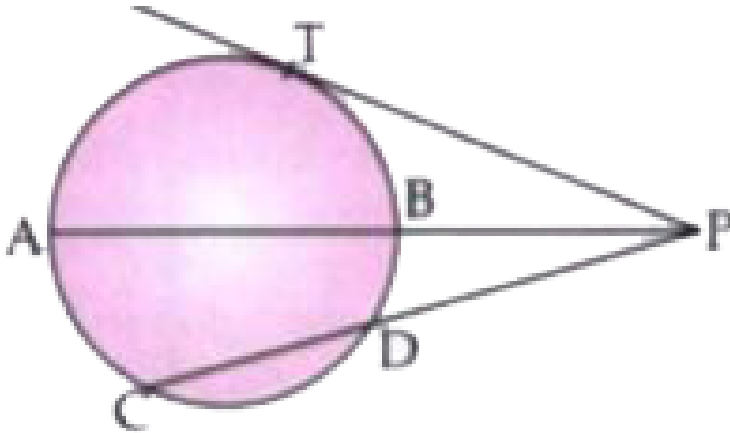
<i>Marks</i>	11- 20	21- 30	31- 40	41- 50	51- 60	61- 70	71- 80
<i>No. of students</i>	2	6	10	12	9	7	4

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14. In the figure given below, diameter AB and chord CD of a circle meet at P. PT is a tangent to the circle at T.  $CD = 7.8$  cm,  $PD = 5$  cm,  $PB = 4$  cm. Find

(i) AB.

(ii) The length of tangent PT.



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15. Let

$$A = \begin{bmatrix} 2 & 1 \\ 0 & -2 \end{bmatrix}, B = \begin{bmatrix} 4 & 1 \\ -3 & -2 \end{bmatrix} \text{ and } C = \begin{bmatrix} -3 & 2 \\ -1 & 4 \end{bmatrix}$$

. Find  $A^2 + AC - 5B$ .



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**16.** The compound interest, calculated yearly, on a certain sum of money for the second year is Rs 1320 and for the third year is Rs 1452. Calculate the rate of interest and the original sum of money.



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**17.** Construct a  $\triangle ABC$  with  $BC = 6.5$  cm,  $AB = 5.5$  cm,  $AC = 5$  cm. Construct the incircle of the triangle. Measure and record the radius of the incircle.



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18. The daily pocket expenses of 200 students in a school are given below : (Use a graph apper for this question.)

<i>Pocket expenses (in ₹)</i>	<i>Number of students (frequency)</i>
0—5	10
5—10	14
10—15	28
15—20	42
20—25	50
25—30	30
30—35	14
35—40	12

Draw a histogram representing the above distribution and estimate the mode from the graph.



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19. If  $(x - 9) : (3x + 6)$  is the duplicate ratio of 4:9, find the value of  $x$  using properties of proportion.

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20. Solve the  $x$  using the quadratic formula. Write your answer correct to two significant figures.

$$(x - 1)^2 - 3x + 4 = 0.$$

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21. A page from the saving bank account of Priyanka is given below :

Date	Particulars	Amount withdrawn (₹)	Amount deposited (₹)	Balance (₹)
3/4/2006	B/F			4000-00
5/4/2006	By Cash		2000-00	6000-00
18/4/2006	By Cheque		6000-00	12000-00
25/5/2006	To Cheque	5000-00		7000-00
30/5/2006	By Cash		3000-00	10000-00
20/7/2006	By Self	4000-00		6000-00
10/9/2006	By Cash		2000-00	8000-00
19/9/2006	To Cheque	1000-00		7000-00

If the interest earned by Priyanka for the period ending September, 2006 is Rs 175, find the rate of interest.

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22. A two digit positive number is such that the product of its digits is 6. If 9 is added to the number, the digits interchange their places. Find the number.

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**23.** The marks obtained by 100 students in a Mathematics 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	3	7	12	17	23	14	9	6	5	4

Draw an ogive for the given distribution on a graph sheet.

(Use a scale of 2 cm = 10 units on both axis).

Use the ogive to estimate the :

(i) median.



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**24.** The marks obtained by 100 students in a Mathematics 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	3	7	12	17	23	14	9	6	5	4



Draw an ogive for the given distribution on a graph sheet.

(Use a scale of 2 cm = 10 units on both axis).

Use the ogive to estimate the :

(ii) lower quartile.



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25. The marks obtained by 100 students in a Mathematics 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	3	7	12	17	23	14	9	6	5	4

Draw an ogive for the given distribution on a graph sheet.

(Use a scale of 2 cm = 10 units on both axis).

Use the ogive to estimate the number of students who

obtained more than 85% marks in the test.



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26. The marks obtained by 100 students in a Mathematics 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	3	7	12	17	23	14	9	6	5	4

Draw an ogive for the given distribution on a graph sheet.

(Use a scale of 2 cm = 10 units on both axis).

Use the ogive to estimate the number of students who did not pass in the test if the pass percentage was 35.



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27. In the figure given below, O is the centre of the circle.

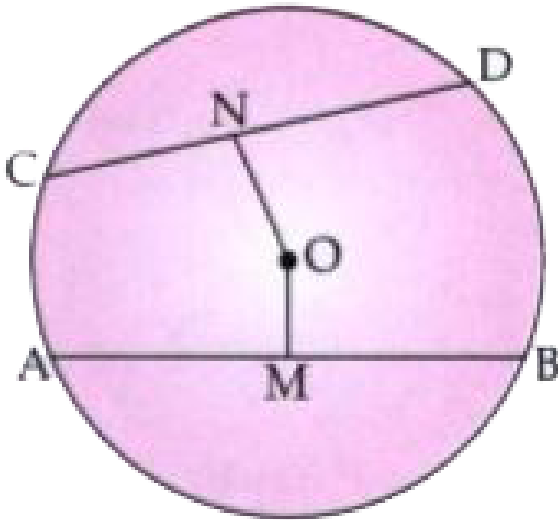
AB and CD are two chords of the circle. OM is

perpendicular to AB and ON is perpendicular to CD. AB =

24 cm, OM = 5 cm, ON = 12 cm. Find the :

(i) radius of the circle

(ii) length of chord CD



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**28.** Prove the identity

$$(\sin\theta + \cos\theta)(\tan\theta + \cot\theta) = \sec\theta + \operatorname{cosec}\theta$$



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**29.** An aeroplane at an altitude of 250 m observes the angle of depression of two boats on the opposite banks of a river to be  $45^\circ$  and  $60^\circ$  respectively. Find the width of the river. Write the answer correct to the nearest whole number.



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