MATHS

BOOKS - SELINA MATHS (ENGLISH)

MATHEMATICS-2011

Section A

1. Find the value of 'k' if (x-2) is a factor of $x^3 + 2x^2 - kx + 10$.

Hence determine whether (x+5) is also a factor.

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2. If $A = \begin{bmatrix} 3 & 5 \\ 4 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 \\ 4 \end{bmatrix}$ is the product AB possible? . Give a reason, if yes, find AB.

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3. Mr. Kumar borrowed Rs 15,000for two years. The rate of interest for the two successive years are 8% and 10% respectively. If he repays Rs 6,200 at the end of the first year, find the outstanding amount at the end of the second year.

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4. From a pack of 52 playing cards, all cards whose numbers are multiples of 3 are removed. A card is now drawn at

random. What is the probability that the card drawn is

(i) a face card (King, Jack or Queen)

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5. From a pack of 52 playing cards, all cards whose numbers are multiples of 3 are removed. A card is now drawn at random. What is the probability that the card drawn is

(ii) an even numbered red card ?

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6. Solve the following equation :

$x - \frac{18}{x} = 6$. Give your answer correct to two significant figures.

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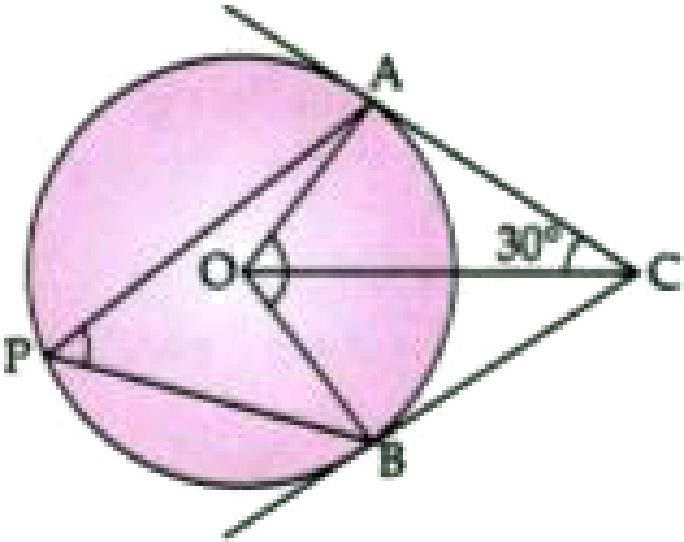
7. In the given figure O is the centre of the circle. Tangents at A and B meets at C.

If $\angle ACO = 30^\circ$, find



$\angle BCO$

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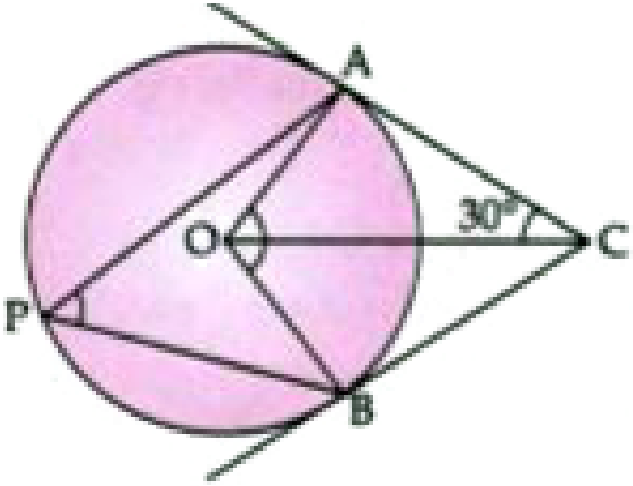
8. In the given figure O is the centre of the circle. Tangents at A and B meets at C.

If $\angle ACO = 30^\circ$, find



$\angle AOB$

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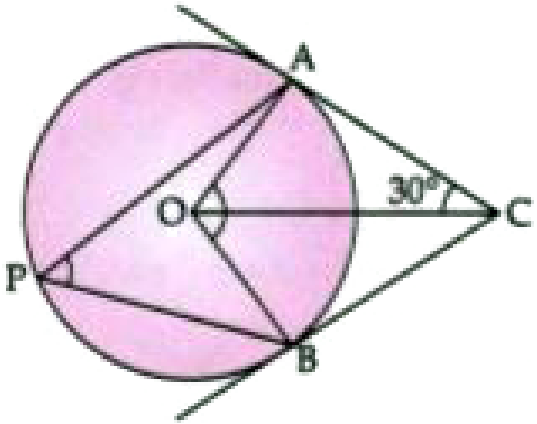
9. In the given figure O is the centre of the circle. Tangents at A and B meets at C.

If $\angle ACO = 30^\circ$, find



$\angle APB$

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10. Ahmed has a recurring deposit account in a bank. He deposits Rs 2,500 per month for 2 years. If the gets Rs 66,250 at the time of maturity, find :

The interest paid by the bank

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11. Ahmed has a recurring deposit account in a bank. He deposits Rs 2,500 per month for 2 years. If the gets Rs 66,250 at the time of maturity, find :

The rate of interest.

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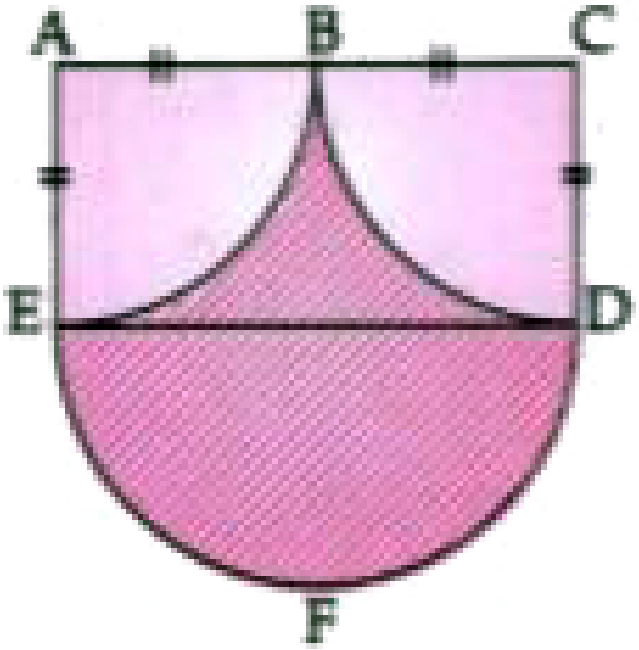
12. Calculate the area of the shaded region, if the diameter of the semi-circle is equal to 14 cm.

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



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13. ABC is a triangle and G (4, 3) is the centroid of the triangle.

If A = (1, 3), B = (4, b) and C = (a, 1), find 'a' and 'b'.

Find the length of side BC.

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14. Solve the following inequality and represent the solution set on the real number line $2x - 5 \leq 5; x + 4 < 11$, where $x \in I$, I is a set of integers.

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15. Evaluate without using trigonometric tables.

$$2\left(\frac{\tan 35^\circ}{\cot 55^\circ}\right)^2 + \left(\frac{\cot 55^\circ}{\tan 35^\circ}\right)^2 - 3\left(\frac{\sec 40^\circ}{\operatorname{cosec} 50^\circ}\right)$$

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16. A mathematics aptitude test of 50 students was recorded as follows :

Marks	50-60	60-70	70-80	80-90	90-100
No. of Students	4	8	14	19	5

Draw a histogram for the above data using a graph paper and locate the mode.

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Section B

1. A manufacturer sells a washing machine to a wholsaler for Rs 15,000. The wholsaler sells it to a trader at a profit of Rs 1,200 and the trader in turn sells it to a consumer at a profit of Rs 1,800. If the rate of VAT is 8% find,

(i) The amount of VAT received by the State Government on the

sale of this machine from the manufacturer and the wholsaler.

(ii) The amount that the consumer pays for the machine.

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2. A solid cone of radius 5 cm and height 8 cm is melted and made into small spheres of radius 0.5 cm. Find the number of spheres formed.

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3. ABCD is a parallelogram where A (x, y), B (5, 8), C (4, 7) and D 2, -4). Find

(i) Coordiantes of A

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4. ABCD is a parallelogram where A (x, y), B (5, 8), C (4, 7) and D 2, -4). Find

(ii) Equation of diagonal BD.

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5. Use a graph paper to answer the following questions.

(Take 1 cm = 1 unit on both axes) :

(i) Plot A (4, 4), B (4, -6) and C (8, 0), the vertices of a triangle ABC.

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6. Use a graph paper to answer the following questions.

(Take 1 cm = 1 unit on both axes) :

(i) Here A (4, 4), B (4, -6) and C (8, 0), the vertices of a triangle ABC.(ii) Reflect ABC on the Y-axis and name it as A'B'C'.

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7. Use a graph paper to answer the following questions.

(Take 1 cm = 1 unit on both axes) :

(i) Here A (4, 4), B (4, -6) and C (8, 0), the vertices of a triangle ABC.(ii) Reflect ABC on the Y-axis and name it as A'B'C'. (iii) Write the coordinates of the images A', B' and C'.

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8. Use a graph paper to answer the following questions.

(Take 1 cm = 1 unit on both axes) :

(iv) Give a geometrical name for the figure AA'C'B'BC.Here A (4,

4), B (4, -6) and C (8, 0),A' (-4, 4), B'(-4, -6) and C'(-8, 0) the vertices of a triangle ABC.

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9. Use a graph paper to answer the following questions.

(Take 1 cm = 1 unit on both axes) :

(v) Identify the line of symmetry of AA'C'B'BC.Here A (4, 4), B (4, -6) and C (8, 0), the vertices of a triangle AB

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10. Mr. Chaudhary opened a Saving's Bank Account at State Bank of India on 1st April, 2007. The entries of one year as shown in his pass book are given below :

Date	Particulars	Withdrawals (in ₹)	Deposits (in ₹)	Balance (in ₹)
1st April, 2007	By Cash	—	8550·00	8550·00
12th April, 2007	To Self	1200·00	—	7350·00
24th April, 2007	By Cash	—	4550·00	11900·00
8th July, 2007	By Cheque	—	1500·00	13400·00
10th Sept., 2007	By Cheque	—	3500·00	16900·00
17th Sept., 2007	To Cheque	2500·00	—	14400·00
11th Oct., 2007	By Cash	—	800·00	15200·00
6th Jan., 2008	To Self	2000·00	—	13200·00
9th March, 2008	By Cheque	—	950·00	14150·00

If the bank pays interest at the rate of 5% per annum, find the interest paid on 1st April, 2008. Give your answer correct to the nearest rupee.

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11. Using componendo and dividendo, find the value of x if $\frac{\sqrt{3x+4}+\sqrt{3x-5}}{\sqrt{3x+4}-\sqrt{3x-5}}=9.$

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12. If $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}, B = \begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$ and I is the identify matric of the same order and A^t is the transpose of matrix A, find $A^tB + BI$.

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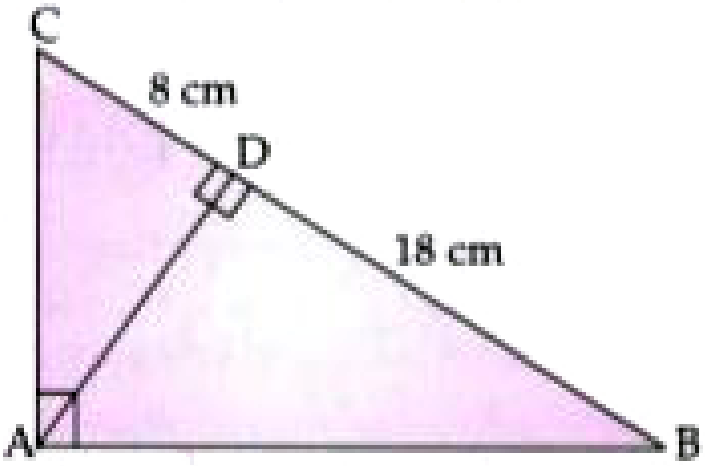
13. In the following figure ABC is a right angled triangle with $\angle BAC = 90^\circ$, and $AD \perp BC$.



(i) Prove $\Delta ADB \sim \Delta CDA$.

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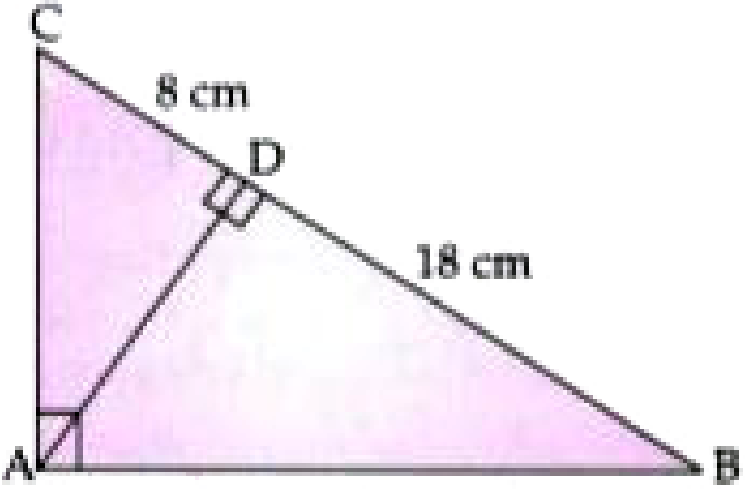
14. In the following figure ABC is a right angled triangle with $\angle BAC = 90^\circ$, and $AD \perp BC$.



If BD = 18 cm, CD = 8 cm find AD.

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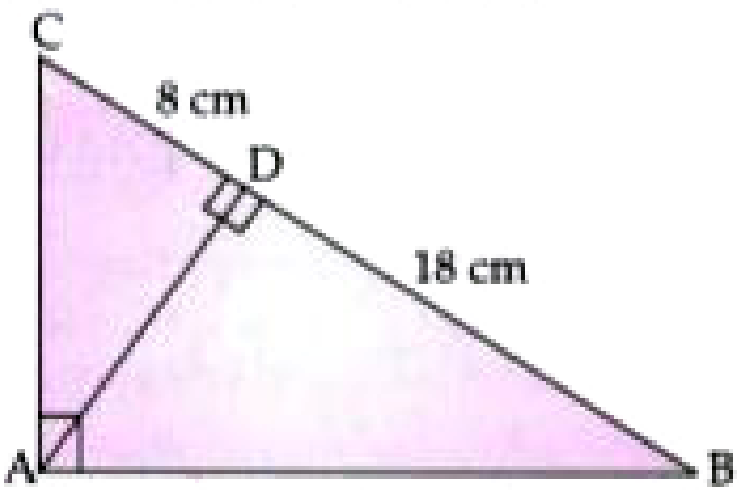
15. In the following figure ABC is a right angled triangle with $\angle BAC = 90^\circ$, and $AD \perp BC$.



Find the ratio of the area of ΔADB to area of ΔCDA.

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16. Using step-deviation method, calculate the mean marks of the following distribution.

Class interval	50–55	55–60	60–65	65–70	70–75	75–80	80–85	85–90
Frequency	5	20	10	10	9	6	12	8

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17. State the modal class.

Class interval	50–55	55–60	60–65	65–70	70–75	75–80	80–85	85–90
Frequency	5	20	10	10	9	6	12	8

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18. Marks obtained by 200 students in an examination are given below :

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	5	11	10	20	28	37	40	29	14	6

Draw an ogive for the given distribution taking 2 cm = 10 marks on one axis and 2 cm = 20 students on the other axis. Using the graph, determine :

(i) The median marks

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19. Marks obtained by 200 students in an examination are given below :

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	5	11	10	20	28	37	40	29	14	6

Draw an ogive for the given distribution taking 2 cm = 10 marks on one axis and 2 cm = 20 students on the other axis. Using the graph, determine :

(ii) The number of students who failed if minimum marks required to pass is 40.

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20. Marks obtained by 200 students in an examination are given below :

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	5	11	10	20	28	37	40	29	14	6

Draw an ogive for the given distribution taking 2 cm = 10 marks

on one axis and 2 cm = 20 students on the other axis. Using the graph, determine :

(iii) If scoring 85 and more marks is considered as grade one, find the number of students who secured grade one in the examiantion.

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21. Mr.Parkeh invested 52000 on $100rs$ shares at a discount of $20rs$ paying 8% dividend. At the end of one year he sells the shares at a premium of $20rs$. Find

(i) the annual dividend

(ii) the profit earned including his dividend

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22. Mr.Parkeh invested 52000 on $100rs$ shares at a discount of $20rs$ paying 8% dividend. At the end of one year he sells the shares at a premium of $20rs$. Find

(i) the annual dividend

(ii) the profit earned including his dividend

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23. Draw a circle of radius 3.5 cm. Mark a point P outside the circle at a distance of 6 cm from the centre. Construct two tangents from P to the given circle. Measure and write down the length of one tangent.

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24. Prove that

$(\text{cosec}A - \sin A)(\sec A - \cos A)\sec^2 A = \tan A.$

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25. 6 is the mean proportion between two numbers x and y and 48 is third proportion to x and y. Find the numbers.

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26. In what period of time will Rs 12,000 yield Rs 3,972 as compound interest at 10% per annum, if compounded on an yearly basis ?

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27. A man observes the angle of elevation of the top of a building to be 30°. He walks towards it in a horizontal line through its base. On covering 60 m the angle of elevation changes to 60°. Find the height of the building correct to the nearest metre.

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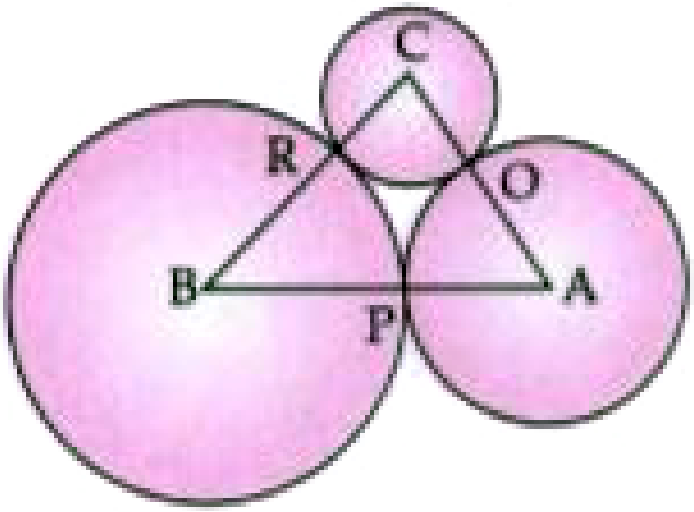
28. ABC is a triangle with AB = 10 cm, BC = 8 cm and AC = 6 cm (not drawn to scale). Three circles are drawn touching each other with the vertices as their cintres. Find the radius of the

three circles.



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29. Rs 480 is dividend equally among 'x' children. If the number of children were 20 more than each would have got Rs 12 less. Find 'x'.

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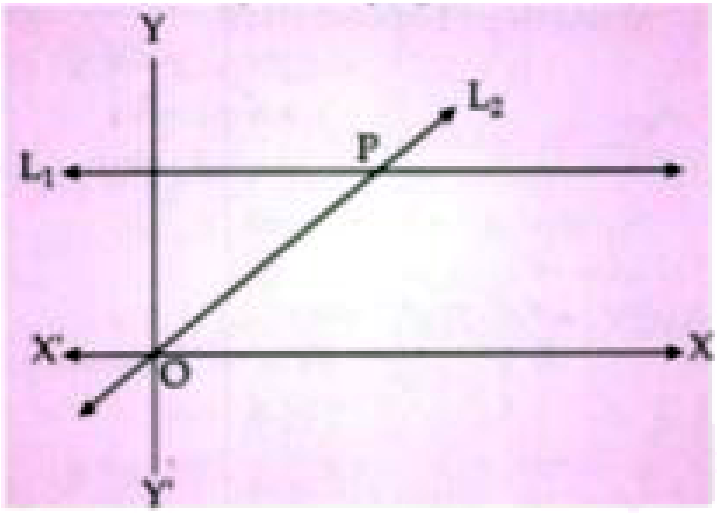
30. In the given figure, Given equation of line L_1 is y = 4.

Write the slope of line L_2 if L_2 is the bisector of angle O.



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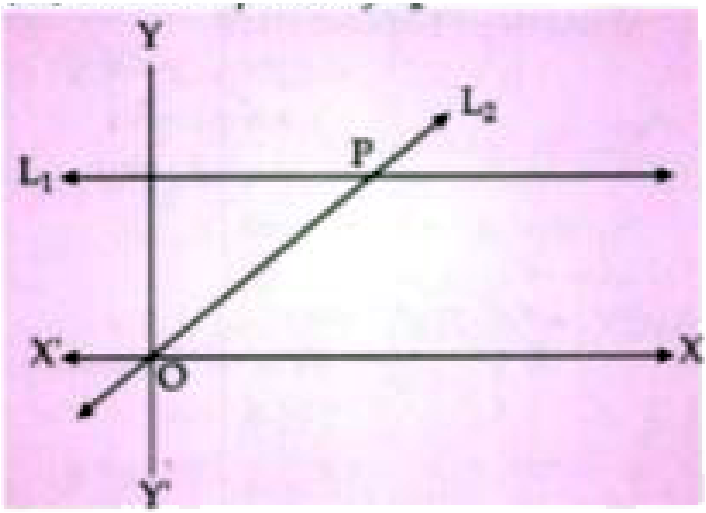
31. Given equation of line L_1 is y = 4 and line L2 is the bisector of angle O.

Write the coordinates of point P.



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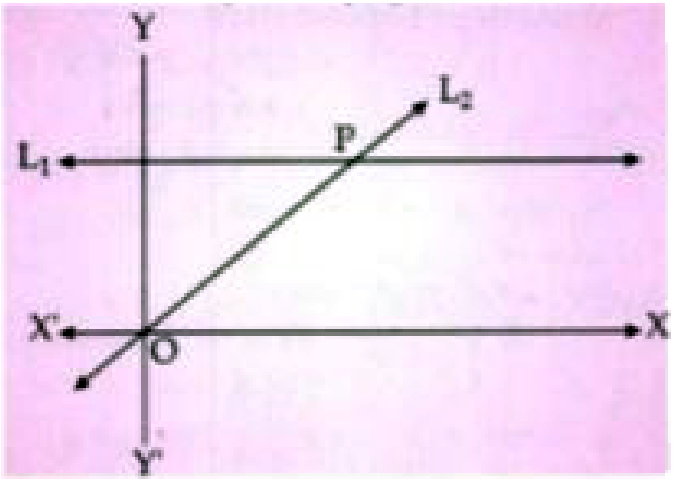
32. Given equation of line L_1 is y = 4.

(iii) Find the equation of L_2.



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