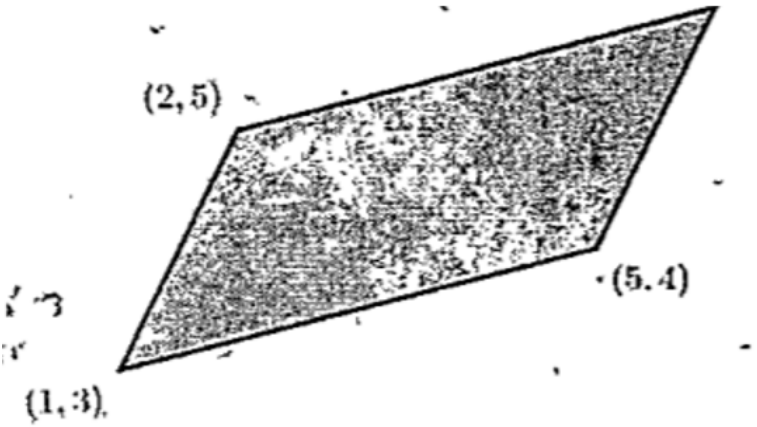
MATHS

BOOKS - V PUBLICATION

GEOMETRY AND ALGEBRA

Question Bank

1. What are the coordinates of the fourth vertex of the parallelogram shown below.



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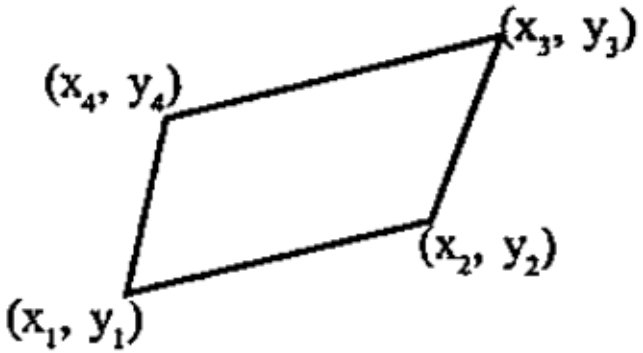
2. The figure shows a parallelogram with the coordinates of its vertices: Prove that

$x_1 + x_3 = x_2 + x_4$ and $y_1 + y_3 = y_2 + y_4$



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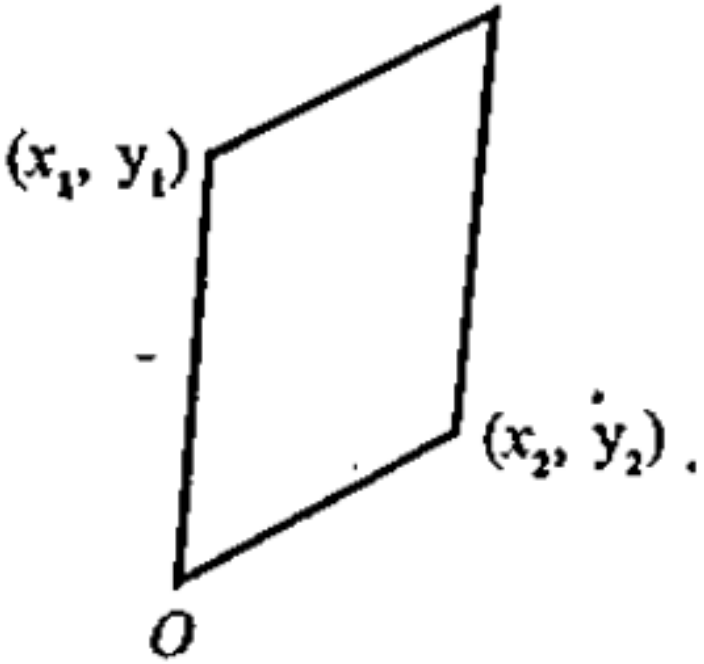
3. A parallelogram is drawn with the lines joining (x_1, y_1) and (x_2, y_2) to the origin as adjacent sides."What are the coordinates of

the fourth vertex?



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4. Prove that in any parallelogram, the 'sum of the squares of all sides is equal to the sum of

the squares of the diagonals'.

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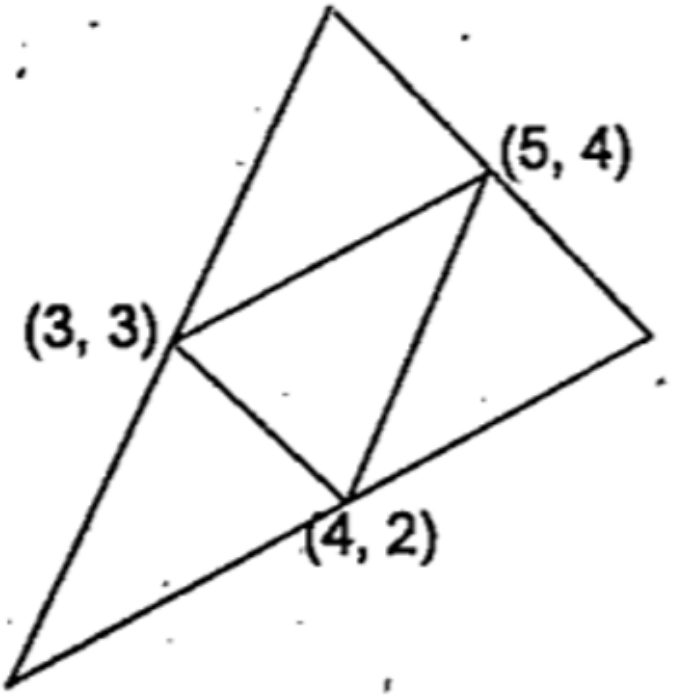
5. In this picture, the mid points of the sides of the large triangle are joined to make a small triangle inside.



Calculate the co-ordínates of the vertices of the large triangle.

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6. A circle is drawn with the line joining '(2,3)' and '(6 , 5)' as diameter. What are the coordinates of the centre of the circle?

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7. The coordinates of two opposite vertices of a parallelogram are '(4,5)' and '(1,3)'. What are the coordinates of the polnt of intersection of its diagonals?

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8. The coordinates of the vertices of a quadrilateral taken in order are '(2,1)', '(5,3), (8,7),(4,9)'.

i) Find the coordinates of the midpoints of all four sides.

ii) Prove that the quadrilateral got by joining these mid points is a parallelogram.

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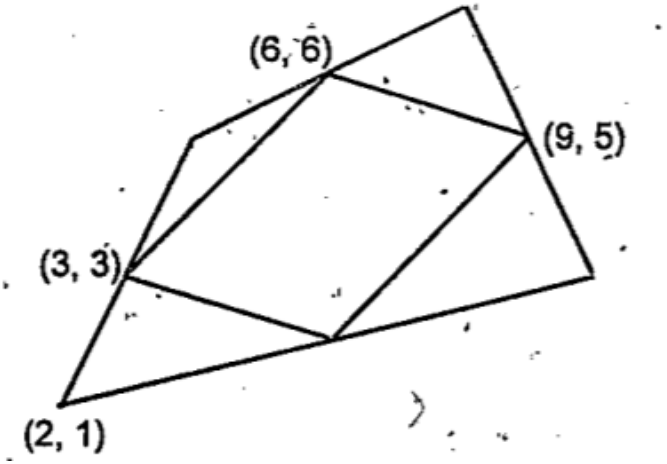
9. In the picture, the mid points of the large rilateral are. joined to form the smaller rilateral within.



i) Find the coordinates of the fourth. vertex of the smaller rilateral.

ii) Find the coordinates of the other three vertices of the larger rilateral.

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10. The coordinates of the vertices of a triangle are (3,5), (9,13), (10,6), Prove that this triangle is isosceles. Calculate its area.


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11. The centre of a circle is '(1,2)' and a point on it is '(3,2)'. Find the coordinates of the other end of the diameter through this point.


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12. If 'A(2,-1)' B '(3,4), C(-2,3)' are the vertices of a parallelogram find the fourth vertex.

13. In triangle 'ABC,(4,2)' is the mid point of 'AB'. The mid point of 'BC' is '(5,4)', the mid point of 'AC' is '(3,3)'

Draw a rough figure.

Find the vertices of the triangle.

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14. If the points 'A(2,-2), B(14 , 10) C (11,13)' are the three vertices of a rectangle find the fourth vertex, 'D'.

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15. Find the coordinates of the midpoint of the line joining the points '(1,-2)', '(-3,4)'

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16. The points 'A(6,1), B(8,2), C(9,4)', D '(p, 3)' are the vertices of a parallelogram.

Find the value of p using the concept that the diagonals of a parallelogram bisect each other

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17. One end of the diameter of a circle is (1, 4).

The center of the circle is '(3,-4)'.

Find the coordinates of the other end.

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18. Calculate the coordinates of the point dividing the line joining the points '(1,6)' and '(11,2)' in the ratio '3: 5'

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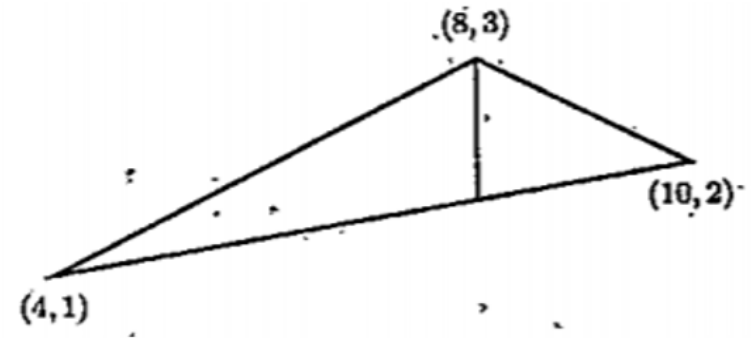
19. Now look at this pictüre:



The line inside the large triangle is the bisector of the top angle. We want to find the coordinates of the point where it meets the bottom side. That is we have to find the coordinates of 'D .'

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20. The coordinates of two points 'A' and 'B' are '(3,2)' and '(8,7)'

Find the coordinates of:

i) the point 'P' on 'A B' with 'A P: P B=2: 3'

ii) the point 'Q' on 'A B' with 'A Q: Q B=3: 2'

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21. Find the coordinates of the points which divide the line joining '(1,6)' and '(5,2)' into three equal parts.

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22. The coordinates of the vertices of a triangle are(-1,5),(3,7),(1,1).Find the coordinates of its centroid.

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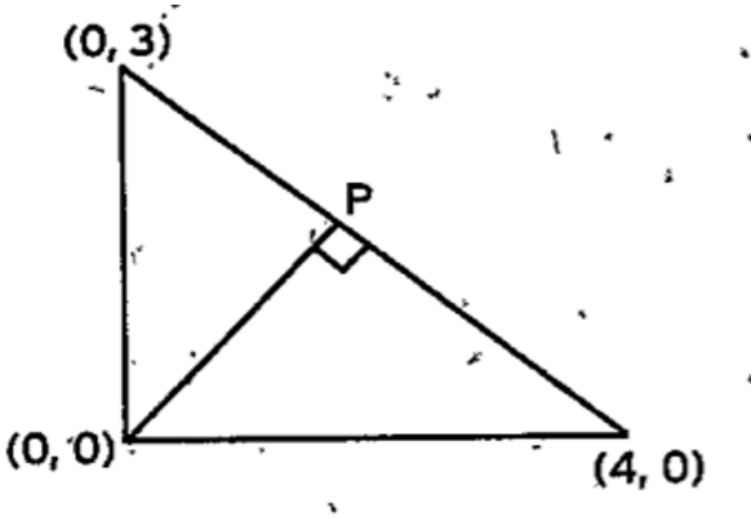
23. Calculate the coordinates of the point P in the picture.



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24. Find the coordinates of the points 'P' and 'Q' which trisect the line joining '(2,-3)' and '(4,-1)'

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25. Prove that A(6,4),B(5,-2),C(7,-2) is an isosceles triangle. If D is the mid point of the side BC ,find the coordinates of D. Calculate the length of this median. Also find the coordinates of centroid.

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26. Find the coordinates of the point which divides the line joining '(4,-3),(9,7)' in the ratio

'3: 4'.

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27. In Δ ABC A(6,8),B(3,4),C(-2,2) are its vertices. The bisector of $\angle A$ cuts BC at D. Find BD:CD.

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28. Prove that the points '(1,3),(2,5)' '(3,7)' are on the same line.

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29. Find the coordinates of two more points on the line joining '(-1,4)' and '(1,2)'.

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30. x_1, x_2, x_3 and $y_1, y_2, y_3 \ldots\ldots$ are arithmetic sequences. Prove that all points with coordinates in the sequence $(x_1, y_1), (x_2, y_2), (x_3, y_3), \ldots\ldots\ldots\ldots$ of number pairs are on the same line.

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31. Prove that if the points $(x_1, y_1), (x_2, y_2), (x_3, y_3)$ are on a single line, then the points $(3x_1 + 2y_1, 3x_1 - 2y_1), (3x_2 + 2y_2, 3x_2 - 2y_2)$ $(3x_3 + 2y_3, 3x_3 - 2y_3)$ are also on a single line. Would this be true if we take some other numbers instead of 3 and 2 ?

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32. Find the equation of the line joining (1,2) and (2,4), For points on this line with the consecutive natural numbers '3,4,5, '.....as the 'x' coordinates, what is the sequence of y coordinates?

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33. Find the equation of the line joining (-1,3) and (2,5).Prove that if the point (x,y)is on this line,so is the point (x+3,y+2).

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34. Prove that whatever number we take as x,the point (x,2x+3) is a point on the line joining (-1,1) and (2, 7).

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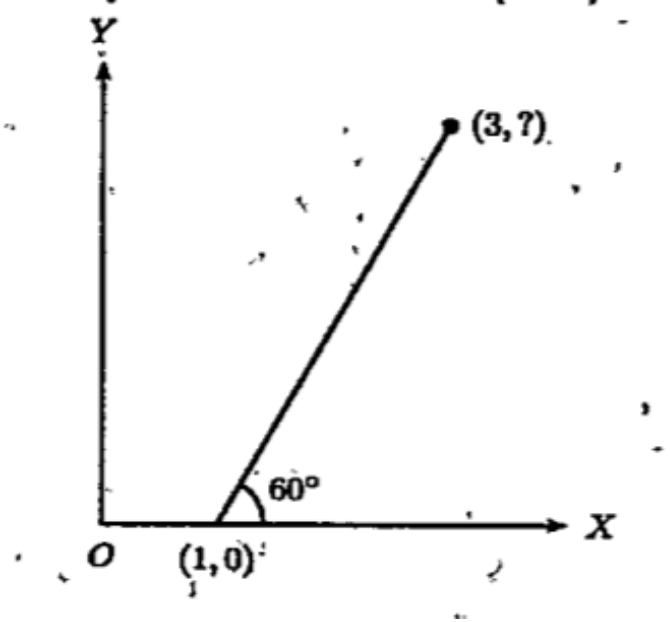
35. In the picture below, the x coordinate of a point on the slanted (blue) line is 3.

i) What is its y coordinate?



ii) What is the slope of the line?

iii) Write the equation of the line.

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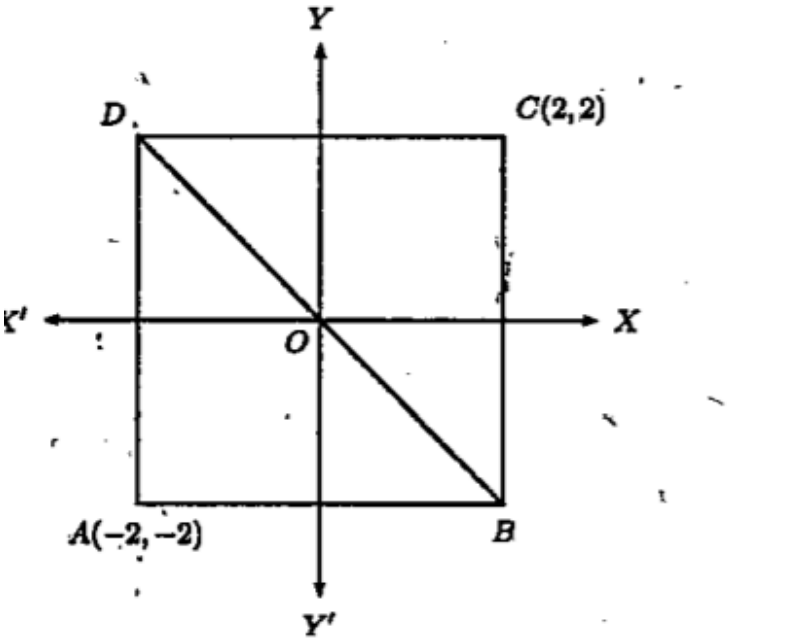
36. In the picture here, 'ABCD' 'is a square. Prove that for any point on the diagonal 'BD',

the sum of the 'x' and ' y' coordinates is zero.



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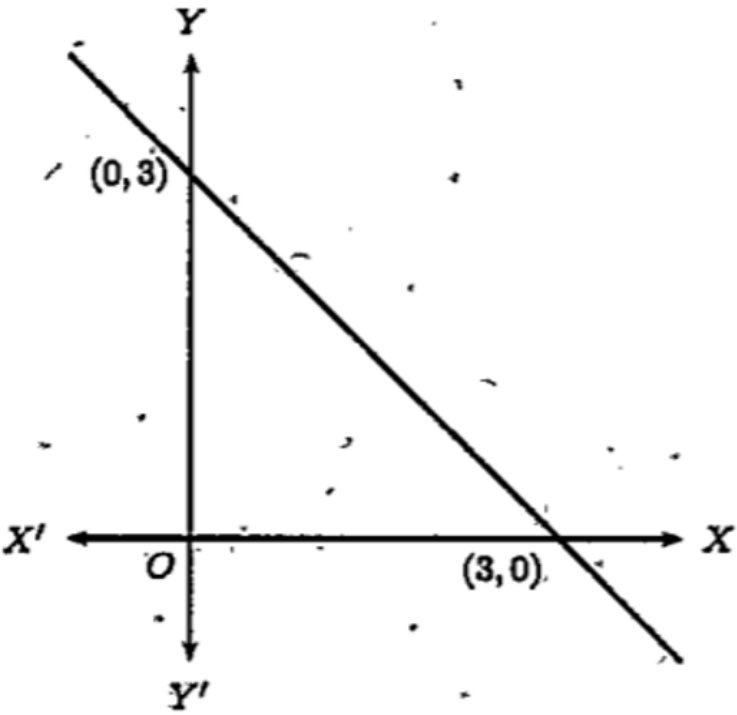
37. Prove that for any point on the line intersecting the axes in the picture, the sum of

the 'x' and 'y' coordinates is 3 .



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38. Find the equation of the circle with centre at the origin and radius '5 .' Write the coordinates of eight points on this circle.

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39. Prove that if '(x, y)' be a point on the circle with the line joining '(0,1)' and '(2,3)' as diameter, then 'x^2+y^2-2 x-4 y+' '3=0'. Find the coordinates of the points where this circle cuts the 'y' axis:

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40. What is the equation of the circle shown below?

'(##VPU_TTT_MAT_X_P02_C09_E07_009_Q01##)'

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41. What are the coordinates of the centroid of the triangle with vertices (x_1, y_1) (x_2, y_2) and(x_3, y_3)

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42. We have seen that the points (3,5),(6,7), (9,9) are points on the same line. is there any relation between the 'x' coordinates 3,6 .and 9 of these points? What about the y coordinates 5,7,9 ? Can you find some more points on this line with natural number coordinates?

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43. Prove that the quadrilateral formed by joining the points '(-1,-1),(6,6),(5,7)' '(-2,6)' is cyclic.

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44. (7,10)' is a point on the circle centred at '(1,2) .' Find the length of the tangent from the point '(-25,2)' to the circle.

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45. If a circle is drawn with centre as origin and radius 2, then how many points has on the circle in which 'x' and 'y' co ordinatés are integers. Iś the centre '(2 , 3) ?' What about the points in which any co ordinate is an integer?

'(##VPU_TTT_MAT_X_P02_C09_E08_003_Q01##)'

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46. Prove that for all points on the line joining the origin and the point (4,2), the 'x' -

coordinate is double the 'y-' coordinate. What is the equation of this line?

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47. What is the equation of the line joining the points '(1,3),(2,7) ?' Prove that if '(x, y)' is a point on this line, so is the point '(x+1, y+4)'

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48. What is the point at which the line $2x + 4y - 1 = 0$ cuts the x -axis? What about the y - axis?

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49. Prove that the equations $3x + 2y + 5 = 0$ and $3x + 2y - 1 = 0$ are parallel.

What are the points of the lines cut the x - axis? What about the y-axis?

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50. a) If 'C(-1, k)' is a point on the line passing through the point 'A(2,4)' and 'B(4,8)' which number is 'K' ?

b) What is the relation between the 'x' coordinate and the y.coordinate of any point on this line?

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51. C' is the centre of the circle passing through the origin. Circle cúts the 'y' axis at

'A(0,4)' and the axis at 'B(4,0)'.

a) Write coordinates of C.

b) Write the equation of the circle.

c) '(0,0)' is a point on the circle. There is one more point on the circle with. 'x' and y coordinates'equal. Which is that point?

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52. A circle is drawn with the origin as centre. It passes through

the point $(3, 3)$

a) What is the radius of the circle?

b) Write the coordinates of a point where the circle meets

the X - axis.

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53. The coordinates of the vertices of a triangle are 'A(1,1), B(5,5) , C(2,5)'

a), Write the coordinates of the midpoint D of AB.

b) What is the length of CD?

c) What are the coordinates of the point dividing the line 'CD' in the ratio '2: 1 ?'

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54. A circle with centre '(3,4)' passes through the origin.

a) What is the radius of the circle.

b) If a point on the circle is '(x, y)', write the relation between 'x, y'.

c) Check whether the point '(-2,1)', lies on this circle.

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55. Find the slope of the line joining '(2,4)' and '(4,7)'. Write the coordinates of another point on this line. Check whether '(5,8)' is on this line.

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56. Find the length of line joining 'A(-2,-3)' and 'B(4,5)'. write the equation of circle whose diameter is 'AB'.

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57. A triangle has its vertices 'A(3,2) , B(-5,-4)', 'C(7,8) . P, Q, R' are the midpoints of 'AB', 'BC' and 'AC' respectively.

a) Find the coordinates of 'P, Q' and 'R'.

b) Find the perimeter of $\triangle PQR$.

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58. A(1,2) , B(7,3), C(8,9) are the vertices of a parallelogram ABCD.

Find the coordinates of 'D'.

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59. A(1,2) , B(7,4), C(5,10)' are the vertices of /_\ ABC'. Also 'P, Q',and 'R' are the midpoints of 'AB, BC' and 'AC' respectively.

a) Find the coordinates of 'P, Q' and 'R'.

b) Prove that 'Delta P Q R' is angled.

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60. A(-2,3) , B(6,9)' be two points

a) Find the coordinates of the centre of the circle with diameter 'AB'. Compute the diameter.

b) If 'C' and 'D' are '(-3,5)' and '(5,-1)'. Justify whether 'CD' is a diameter?

c) If 'P' and 'Q' are '(5,10)' and '(-1,2)'. Justify whether 'PQ' is a diameter?

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61. The sum of the 'x' coordinates of the points where the line cut 'x' axis is 14

If (3,4) is a point on it, find the equation of the line.

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