



MATHS

BOOKS - SELINA MATHS (ENGLISH)

SECTION AND MID-POINT FORMULA

Exercise 13 A

1. Calculate the co-ordinates of the point P which divides the line segment joining:

A (1, 3) and B (5,9) in the ratio 1 : 2



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2. Calculate the co-ordinates of the point P which divides the line segment joining: A (-4, 6) and B (3, -5) in the ratio 3:2.



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3. The ratio in which the line segment joining (2, -3) and (5,6) is divided by the x- axis is :



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4. In what ratio is the line joining $(2, -4)$ and $(-3, 6)$ divided by the y -axis ?



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5. In what ratio does the point $(1, a)$ divide the join of $(-1, 4)$ and $(4, -1)$? Also, find the value of a .



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6. In what ratio does the point $(a, 6)$ divide the join of $(-4, 3)$ and $(2, 8)$? Also, find the value of a



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7. In what ratio is the join of $(4, 3)$ and $(2, -6)$ divided by the x -axis ? Also, find the coordinates of the point of intersection.



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8. Find the ratio in which the join of $(-4, 7)$ and $(3, 0)$ is divided by the y -axis. Also, find the co-ordinates of the point of intersection.



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9. Points A, B, C and D divide the line segment joining the point $(5, -10)$ and the origin in five equal parts. Find the co ordinates of B and D.



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10. The line joining the points A (-3, -10) and B (-2, 6) is divided by the point P such that $\frac{PB}{AB} = \frac{1}{5}$. Find the co-ordinates of P.



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11. P is a point on the line joining A (4, 3) and B (-2, 6) such that $5AP = 2BP$. Find the coordinates of P.



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12. Calculate the ratio in which the line joining the points $(-3, -1)$ and $(5, 7)$ is divided by the line $x = 2$.



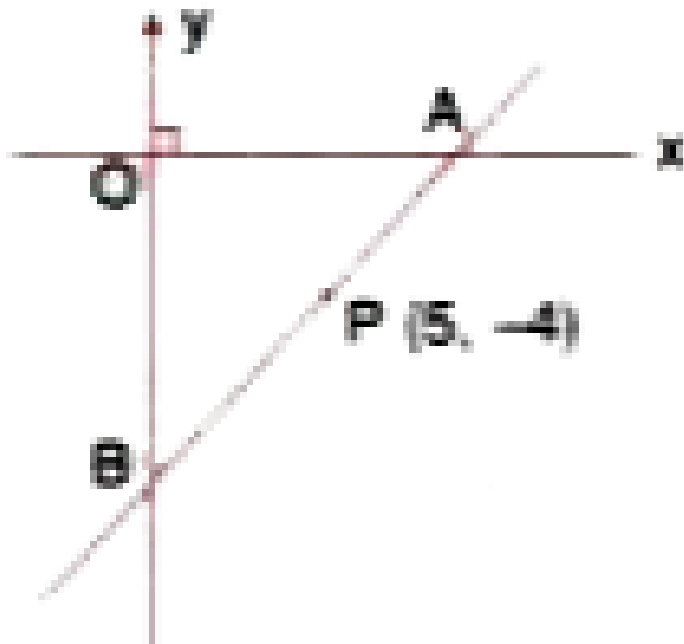
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13. Calculate the ratio in which the line segment $A(6, 5)$ and $B(4, -3)$ is divided by the line $y = 2$.



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14. The point $P(5, -4)$ divides the line segment AB , as shown in the figure, $P(5, -4)$ in the ratio $2:5$. Find the co-ordinates of points A and B .
Given AP is smaller than BP .



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15. Find the co-ordinates of the points of trisection of the line joining the points $(-3, 0)$ and $(6, 6)$.



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16. Show that the line segment joining the points $(-5, 8)$ and $(10, -4)$ is trisected by the co-ordinate axes.



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17. Show that A (3,-2) is a point of trisection of the line-segment joining the points (2, 1) and (5, -8).



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

(iii) the length of AB.



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19. If $A = (-4, 3)$ and $B = (8, -6)$

In what ratio is the line joining A and B ,
divided by the x -axis ?



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20. The line segment joining the points $M (5, 7)$ and $N (-3, 2)$ is intersected by the y -axis at point L . Write down the abscissa of L . Hence, find the ratio in which L divides MN . Also, find the co-ordinates of L .





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21. A (2, 5), B (-1, 2) and C (5, 8) are the co-ordinates of the vertices of the triangle ABC. Points P and Q lie on AB and AC respectively, such that : $AP: PB = AQ: QC = 1:2$.

Calculate the co-ordinates of P and Q.



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22. A (2, 5), B (-1, 2) and C (5, 8) are the co-ordinates of the vertices of the triangle ABC.

Points P and Q lie on AB and AC respectively, such that : $AP: PB = AQ: QC = 1:2$.

Show that : $PQ = \frac{1}{3}BC$.



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23. A (-3, 4), B (3, -1) and C (-2, 4) are the vertices of a triangle ABC. Find the length of line segment AP, where point P lies inside BC, such that $BP: PC = 2 : 3$.



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24. The line segment joining $A(2, 3)$ and $B(6, -5)$ is intercepted by x -axis at the point K . Write down the ordinate of the point K . Hence, find the ratio in which K divides AB . Also, find the co-ordinates of the point K .



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25. The line segment joining $A(4, 7)$ and $B(-6, -2)$ is intercepted by the y -axis at the point K . Write down the abscissa of the point K . Hence,

find the ratio in which K divides AB. Also, find the co-ordinates of the point K.



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26. The line joining $P(-4, 5)$ and $Q(3, 2)$ intersects the y-axis at point R. PM and QN are perpendiculars from P and Q on the x-axis.

Find:

the ratio $PR : RQ$



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27. The line joining $P(-4, 5)$ and $Q(3, 2)$ intersects the y -axis at point R . PM and QN are perpendiculars from P and Q on the x -axis.

Find:

the co-ordinates of R .



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28. The line joining $P(-4, 5)$ and $Q(3, 2)$ intersects the y -axis at point R . PM and QN are perpendiculars from P and Q on the x -axis.

Find:

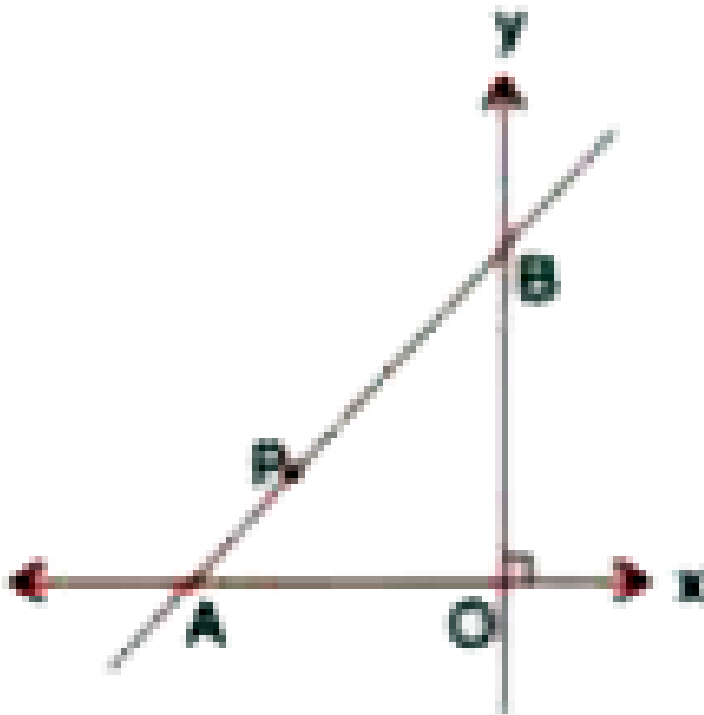
the area of the quadrilateral PMNQ.



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29. In the given figure, line APB meets the x-axis at point A and y-axis at point B. P is the point $(-4, 2)$ and $AP : PB = 1 : 2$. Find the co-

ordinates A and B .



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30. Given a line segment AB joining the points

A (-4, 6) and B (8, -3). Find :

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



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31. 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.



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32. Given a line segment AB joining the points

A $(-4, 6)$ and B $(8, -3)$. Find :

(iii) the length of AB.



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33. If P $(9a-2, -b)$ divides line segment joining A

$(3a+1, -3)$ and B $(8a, 5)$ in the ratio 3:1, then find

the values of a and b.



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Exercise 13 B

1. Find the mid-point of the line segment joining the points :

$(-6, 7)$ and $(3, 5)$



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2. Find the mid-point of the line segment joining the points :

$(5, -3)$ and $(-1, 7)$



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3. Points A and B have co-ordinates (3, 5) and (x, y) respectively. The mid-point of AB is (2, 3).

Find the values of x and y.



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4. A (5, 3), B (-1, 1) and C (7, -3) are the vertices of triangle ABC. If L is the mid-point of AB and M is the mid-point of AC, show

that : $LM = \frac{1}{2}BC$.



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5. Given M is the mid-point of AB, find the coordinates of:

A, if M = (1, 7) and B = (-5, 10),



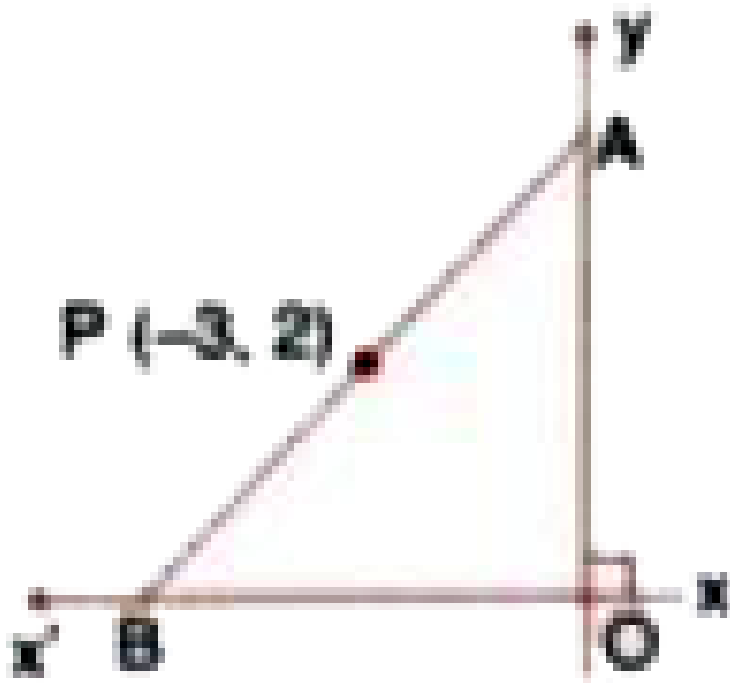
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6. Given M is the mid-point of AB, find the coordinates of:

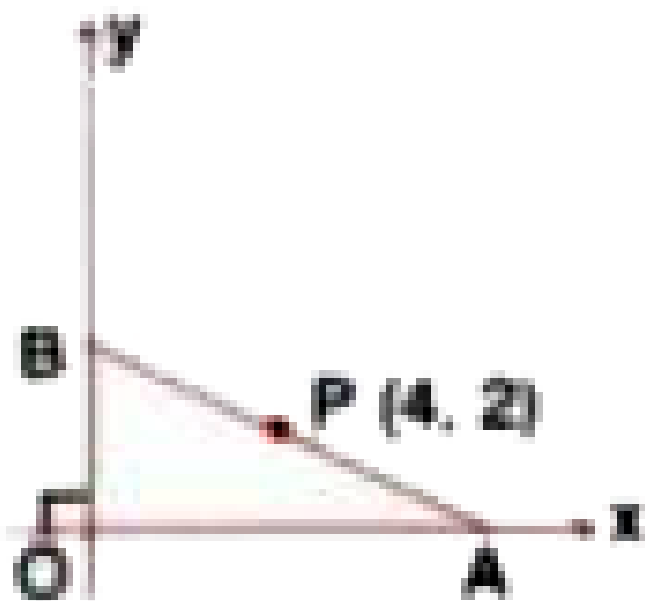
B, if A = (3,-1) and M = (-1, 3).



7. $P(-3, 2)$ is the mid point of line segment AB as shown in the given figure. Find the co-ordinates of points A and B .



8. In the given figure, $P(4, 2)$ is mid-point of line segment AB . Find the co-ordinates of A and B .



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9. $(-5, 2)$, $(3, -6)$ and $(7, 4)$ are the vertices of a triangle. Find the length of its median through the vertex $(3, -6)$.



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10. Given a line ABCD in which $AB = BC = CD$, $B = (0, 3)$ and $C = (1, 8)$. Find the co-ordinates of A and D.



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11. One end of the diameter of a circle is $(-2, 5)$.

Find the co-ordinates of the other end of it, if the centre of the circle is $(2, -1)$.



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12. A $(2, 5)$, B $(1, 0)$, C $(-4, 3)$ and D $(-3, 8)$ are the vertices of quadrilateral ABCD. Find the co-ordinates of the mid-points of AC and BD. Give a special name to the quadrilateral.



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13. P (4, 2) and Q (-1, 5) are the vertices of parallelogram PQRS and (-3, 2) are the co-ordinates of the point of intersection of its diagonals. Find co-ordinates of R and S.



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14. A (-1, 0), B (1, 3) and D (3, 5) are the vertices of a parallelogram ABCD. Find the co-ordinates of vertex C.



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15. The points $(2, -1)$, $(-1, 4)$ and $(-2, 2)$ are mid-points of the sides of a triangle. Find its vertices.



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16. Points $A (-5, x)$, $B (y, 7)$ and $C (1, -3)$ are collinear (i.e. lie on the same straight line) such that $AB = BC$. Calculate the values of x and y .



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17. Points P (a, -4), Q (-2, b) and R (0, 2) are collinear. Q lies between P and R, such that $PQ = 2QR$, calculate the values of a and b.



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18. Calculate the co-ordinates of the centroid of the triangle ABC, if A = (7, -2), B = (0, 1) and C = (-1, 4).



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19. The co-ordinates of the centroid of a triangle PQR are $(2, -5)$. If $Q = (-6, 5)$ and $R = (11, 8)$, calculate the co-ordinates of vertex P.



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20. A $(5, x)$, B $(-4, 3)$ and C $(y, -2)$ are the vertices of the triangle ABC whose centroid is the origin. Calculate the values of x and y .



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Exercise 13 C

1. Given a triangle ABC in which $A = (4, -4)$ $B = (0, 5)$ and $C = (5, 10)$. A point P lies on BC such that $BP : PC = 3 : 2$. Find the length of line segment AP.



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2. $A(20, 0)$ and $B(10, -20)$ are two fixed points. Find the co-ordinates of the point P in AB such

that : $3PB = AB$. Also , find the co-ordinates of some other Point Q in AB such that : $AB = 6 AQ$.



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3. $A(-8, 0)$, $B(0, 16)$ and $C(0, 0)$ are the vertices of a triangle ABC . Point P lies on AB and Q lies on AC such that $AP : PB = 3 : 5$ and $AQ : QC = 3 : 5$.

Show that : $PQ = \frac{3}{8} BC$.



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4. Find the co-ordinates of points of trisection of the line segment joining the point $(6, -9)$ and the origin.



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5. A line segment joining $A\left(-1, \frac{5}{3}\right)$ and $B(a, 5)$ is divided in the ratio 1: 3 at P, the point where the line segment AB intersects the y-axis.

Calculate the value of a'.





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6. A line segment joining $A\left(-1, \frac{5}{3}\right)$ and $B(a, 5)$ is divided in the ratio 1: 3 at P, the point where the line segment AB intersects the y-axis.

Calculate the co-ordinates of 'P'.



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7. In what ratio is the line joining $A(0, 3)$ and $B(4, -1)$ divided by the x-axis ?

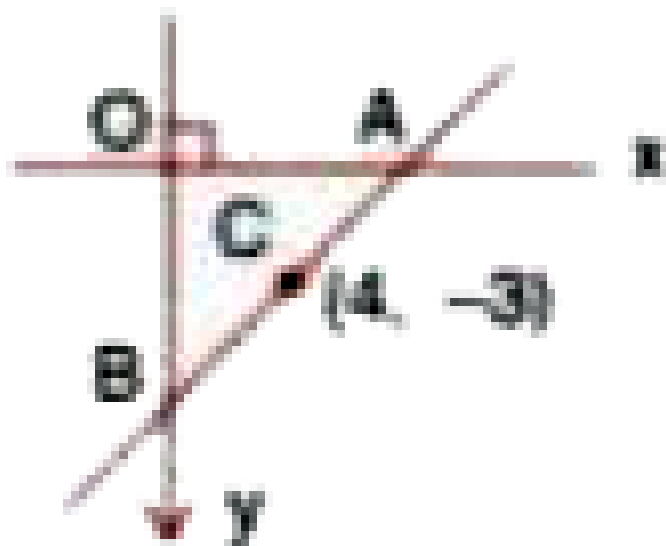
Write the co-ordinates of the point where AB intersects the x-axis.



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8. The mid-point of the A segment AB, as shown in diagram, is C (4, -3). (4, -3) Write

down the co ordinates of A and B.



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9. AB is a diameter of a circle with centre $C = (-2, 5)$. If $A = (3, -7)$. Find

the length of radius AC



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10. AB is a diameter of a circle with centre C = (-2, 5). If A = (3, -7). Find the coordinates of B.



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11. Find the co-ordinates of the centroid of a triangle ABC whose vertices are :

A(-1, 3), B(1, -1) and C(5, 1)



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12. The mid-point of the line segment joining $(4a, 23)$ and $(-4, 3b)$ is $(2, -2a)$. Find the values of a and b



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13. The mid-point of the line segment joining $(2a, 4)$ and $(-2, 2b)$ is $(1, 2a + 1)$. Find the values

of a and b.



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14. Write down the co-ordinates of the point P that divides the line joining A(-4, 1) and B(17, 10) in the ratio 1:2.



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15. write down the coordinate of the point p that divides the line joining A(-4,1) and B(17,10)

in the ratio 1:2

Calculate the distance OP, where O is the origin.



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16. write down the coordinate of the point p that divides the line joining A(-4,1) and B(17,10) in the ratio 1:2

In what ratio does the y-axis divide the line AB ?



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17. Prove that the points $A(-5, 4)$, $B(-1, -2)$ and $C(5, 2)$ are the vertices of an isosceles rightangled triangle. Find the co ordinates of D so that $ABCD$ is a square.



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18. M is the mid-point of the line segment joining the points $A(-3, 7)$ and $B(9, -1)$. Find the co-ordinates of point M . Further, if $R(2, 2)$

divides the line segment joining M and the origin in the ratio $p : q$, find the ratio $p : q$.



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19. 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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20. Determine the ratio in which the line $2x + y - 4 = 0$ divides the line segment joining the points $A(2, 2)$ and $B(3,7)$.



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21. If the abscissa of a point P is 2 , find the ratio in which this point divides the line segment joining the points $(-4, 3)$ and $(6,3)$. Also, find the co-ordinates of point P .



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22. The line joining the points $(2, 1)$ and $(5, -8)$ is trisected at the points P and Q . If point P lies on the line $2x - y + k = 0$, find the value of k . Also, find the co-ordinates of point Q .



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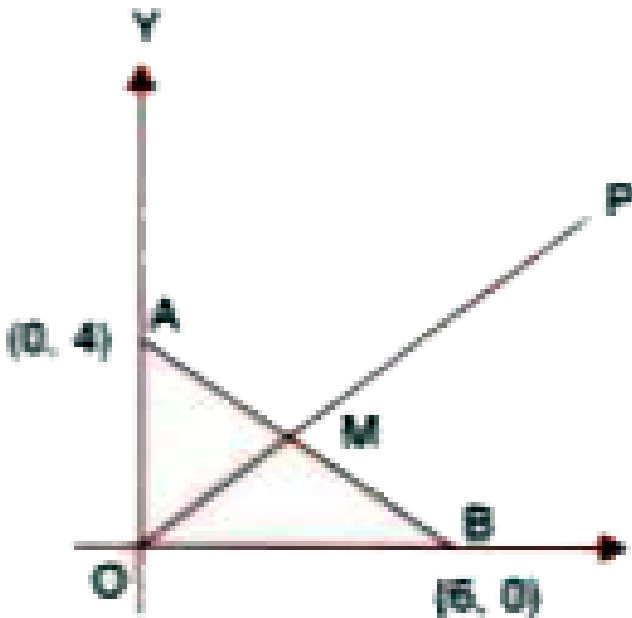
23. Find the image of the point $A(5, -3)$ under reflection in the point $P(-1, 3)$.



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24. M is the mid-point of the line segment joining the points $A(0, 4)$ and $B(6, 0)$. M also divides the line segment OP in the ratio 1:3.

Find :

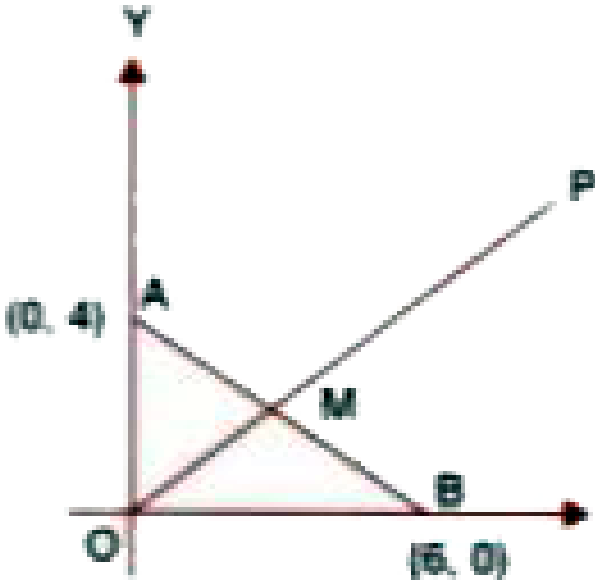


co-ordinates of M



25. M is the mid-point of the line segment joining the points $A(0, 4)$ and $B(6, 0)$. M also divides the line segment OP in the ratio 1:3.

Find :



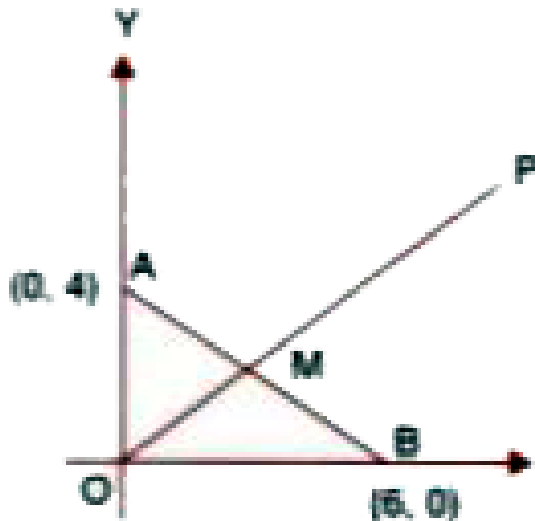
co-ordinates of P



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26. M is the mid-point of the line segment joining the points $A(0, 4)$ and $B(6, 0)$. M also divides the line segment OP in the ratio $1:3$.

Find :



length of BP



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27. A $(-4, 2)$, B $(0, 2)$ and C $(-2, -4)$ are vertices of a triangle ABC. P, Q and R are mid-points of sides BC, CA and AB respectively. Show that the centroid of $\triangle PQR$ is the same as the centroid of $\triangle ABC$.



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28. A(3, 1), B(y, 4) and C(1, x) are vertices of triangle ABC and G(3, 4) is its centroid. Find the values of x and y. Also, find the length of side BC.



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Questions

1. Find the co-ordinates of point P which divides the line joining A (4,-5) and B (6,3) in

the ratio 2 : 5.



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2. Find the ratio in which the point $(5,4)$ divides the line joining points $(2,1)$ and $(7,6)$



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3. In what ratio is the joining the points $(4,2)$ and $(3,-5)$ divided by the x-axis ? Also, find the co-ordinates of the point of intersection.



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4. Calculate the ratio in which the line joining the points $(4,6)$ and $(-5,4)$ is divided by the line $y = 3$. Also, find the co-ordinates of the point of intersection.



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5. The origin O , $B(-6,9)$ and $C(12, -3)$ are vertices of triangle OBC , Point P divides OB in the ratio

1 : 2 and point Q divides OC in the ratio 1 : 2

Find the co-ordinates of points P and Q. Also

show that $PQ = \frac{1}{3} BC$.



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6. Find the co-ordinates of the points of trisection of the segment joining the points A (6,-2) and (-8,10).



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7. Show that $P(3, m - 5)$ is a point of trisection of the line segment joining the points $A(4, -2)$ and $B(1, 4)$. Hence, find the value of ' m '.



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8. If the point $P(-1, 2)$ divides the join of points $A(2, 5)$ and $B(a, b)$ in the ratio $3 : 4$, find the value of $a \times b - a$.



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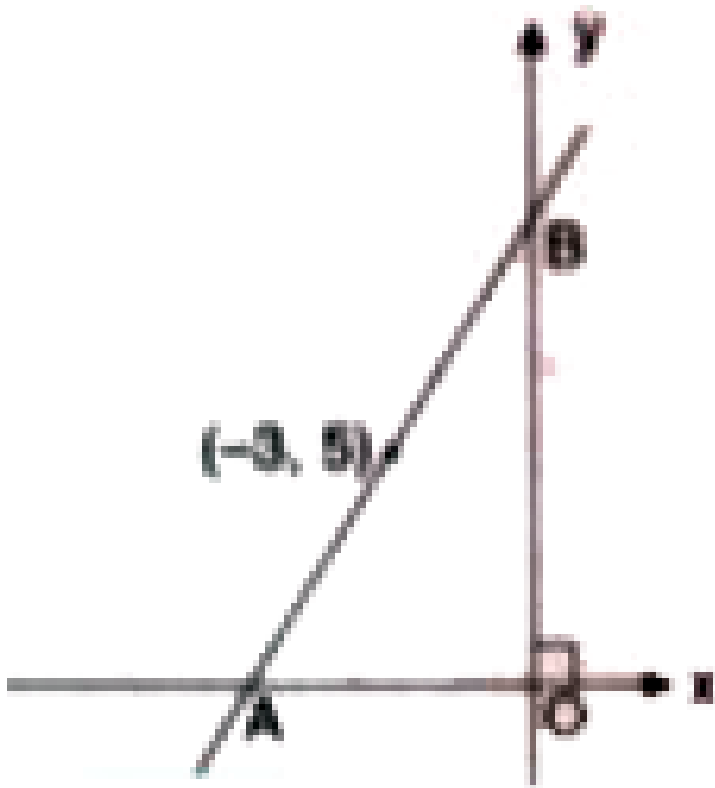
9. Find the co-ordinates of the mid point of the line segment joining the points P (4, -6) and (-2, 4).



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10. The mid - point of line segment AB (shown in the diagram) is (-3, 5), Find the co-ordinates

of A and B.



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11. Points $A(7, -4)$, $B(-5, 5)$ and $C(-3, 8)$ are vertices of triangle ABC , Find the length of its median through vertex A .



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12. $A(14, -2)$, $B(6, -2)$ and $D(8, 2)$ are the three vertices of a parallelogram $ABCD$. Find the coordinates of the fourth vertex C .



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13. The mid-point of the segment joining $(3m, 6)$ and $(-4, 3n)$ is $(1, 2m, -1)$. Find the values of m and n .



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14. The point $A(3, -5)$ is reflected in the point $P(-4, 3)$ as point A' . Find the co-ordinates of point A' .



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15. If the mid-point of the segment joining the points $A(3,4)$ and $B(k,6)$ is (x,y) and $x + y = 10$, find the value of k and the length of the line segment AB .



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16. Find the co-ordinates of the point of intersection of the medians of triangle ABC , given $A = (-2, 3)$, $B = (6, 7)$ and $C = (4,1)$.



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17. 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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