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Q1. Find the coordinates of the point which divides the line segment joining the points (4, – 3) and (8, 5) in the ratio 3 : 1 internally.

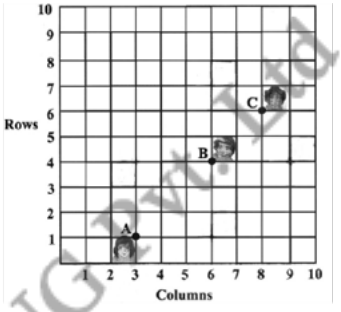
Q2. Find the area of a triangle whose vertices are (1, – 1), (– 4, 6) and (– 3, – 5).

Q3. Find the area of a triangle formed by the points A (5, 2), B (4, 7) and C (7, – 4).

Q4. Find the area of the triangle formed by the points P (– 1.5, 3), Q (6, – 2) and R (– 3, 4).

Q5. Find the value of k if the points A (2, 3), B (4, k) and C (6, – 3) are collinear.

Q6. Figure shows the arrangement of desks in a classroom. Ashima, Bharti and Camella are seated at A (3, 1), B (6, 4) and C (8, 6) respectively. Do you think they are seated in a line? Give reasons for your answer.



Q7. Find a relation between x and y such that the point (x, y) is equidistant from the points (7, 1) and (3, 5).

Q8. If the points A (6, 1), B (8, 2), C (9, 4) and D (p, 3) are the vertices of a parallelogram, taken in order, find the value of p.

Q9. Find the distance between the points (0, 0) and (36, 15). Can you now find the distance between the two towns A and B discussed in section 7.2.

Q10. Check whether (5, – 2), (6, 4) and (7, – 2) are the vertices of an isosceles triangle.

Q11. Find the ratio in which the line segment joining A (1, – 5) and B (– 4, 5) is divided by x-axis. Also find the coordinates of the point of division.

Q12. Find the coordinates of the points of trisection of the line segment joining (4, – 1) and (– 2, – 3).

Q13. Find the ratio in which the line segment joining the points (– 3, 10) and (6, – 8) is divided by (– 1, 6).

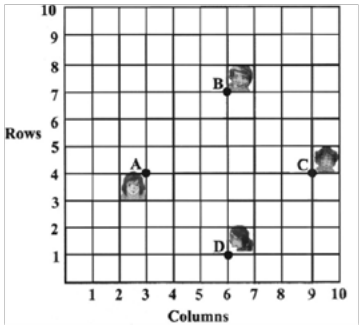
Q14. Find the coordinates of the point which divides the join of (– 1, 7) and (4, – 3) in the ratio 2 : 3.

Q15. Find the values of y for which the distance between the points P (2, – 3) and Q (10, y) is 10 units.

Q16. Find a relation between x and y such that the point (x, y) is equidistant from the point (3, 6) and (– 3, 4).

Q17. Find the point on the x-axis which is equidistant from (2, – 5) and (– 2, 9).

Q18. In a classroom, 4 friends are seated at the points A, B, C and D as shown in figure. Champa and Chameli walk into the class and after observing for a few minutes Champa asks Chameli, "Don't you think $ABCD$ is a square?" Chameli disagrees. Using distance formula, find which of them is correct.



Q19. Determine if the points (1, 5), (2, 3) and (– 2, – 11) are collinear.

Q20. Find the coordinates of a point A, where AB is the diameter of a circle whose centre is (2, – 3) and B is (1, 4).

Q21. If A and B are (– 2, – 2) and (2, – 4), respectively, find the coordinates of P such that $AP = \frac{3}{7} AB$ and P lies on the line segment AB.

Q22. Find a relation between x and y if the points (x, y), (1, 2) and (7, 0) are collinear.

Q23. Find the centre of a circle passing through the points (6, – 6), (3, – 7) and (3, 3).

Q24. Do the points (3, 2), (– 2, – 3) and (2, 3) form a triangle? If so, name the type of triangle formed.

Q25. Show that the points (1, 7), (4, 2), (– 1, – 1) and (– 4, 4) are the vertices of a square.

Q26. Find a point on the y-axis which is equidistant from the points A (6, 5) and B (– 4, 3).

Q27. In what ratio does the point (– 4, 6) divide the line segment joining the points A (– 6, 10) and B (3, – 8)?

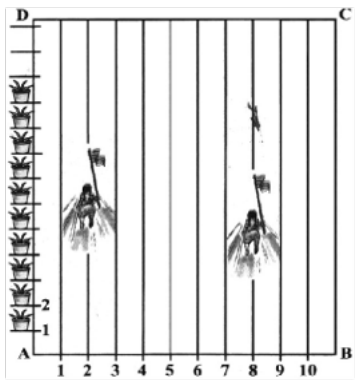
Q28. Find the coordinates of the points of trisection (*i.e.*, points dividing in three equal parts) of the line segment joining the points A (2, – 2) and B (– 7, 4).

Q29. Find the ratio in which the y-axis divides the line segment joining the points (5, – 6) and (– 1, – 4). Also find the point of intersection.

Q30. If A (– 5, 7), B (– 4, – 5), C (– 1, – 6) and D (4, 5) are the vertices of a quadrilateral, find the area of the quadrilateral $ABCD$.

Q31. If Q (0, 1) is equidistant from P (5, – 3) and R (x, 6), find the values of x. Also find the distances QR and PR.

Q32. To conduct Sports Day activities, in your rectangular shaped school ground $ABCD$, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AD, as shown in figure. Niharika runs $\frac{1}{4}$ the distance AD on the 2nd line and posts a green flag. Preet runs $\frac{1}{5}$ the distance AD on the eighth line and posts a red flag. What is the distance between both the flags? If Rashmi has a to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag?



Q33. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y.

Q34. Find the coordinates of the points which divide the line segment joining $A(-2, 2)$ an $B(2, 8)$ into four equal parts.

Q35. Find the area of a rhombus if its vertices are $(3, 0)$, $(4, 5)$, $(-1, 4)$ and $(-2, -1)$ taken in order.

[Hint: Area of a rhombus = $\frac{1}{2}$ (product of its diagonals)]

Q36. Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are $(0, -1)$, $(2, 1)$ and $(0, 3)$. Find the ratio of this area to the area of the given triangle.

Q37. Find the area of the quadrilateral whose vertices, taken in order, are $(-4, -2)$, $(-3, -5)$ $(3, -2)$ and $(2, 3)$.

Q38. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer:

$(-1, -2)$, $(1, 0)$, $(-1, 2)$, $(-3, 0)$

Q39. $ABCD$ is a rectangle formed by the points $A(-1, -1)$, $B(-1, 4)$, $C(5, 4)$ and $D(5, -1)$. P, Q, R and S are the mid-points of AB, BC, CD and DA respectively. Is the quadrilateral $PQRS$ a square? A rectangle? Or a rhombus? Justify your answer.

Q40. The vertices of a ΔABC are $A(4, 6)$, $B(1, 5)$ and $C(7, 2)$. A line is drawn to intersect sides AB and AC at D and E respectively, such that $\frac{AD}{AB} = \frac{AE}{AC} = \frac{1}{4}$. Calculate the area of the ΔADE and compare it with the area of ΔABC. (Recall Theorem 6.2 and Theorem 6.6)

Q41. The two opposite vertices of a square are $(-1, 2)$ and $(3, 2)$. Find the coordinates of the other two vertices.

Q42. Determine the ratio in which the line $2x + y - 4 = 0$ divides the line segment joining the points $A(2, -2)$ and $B(3, 7)$.

Q43. You have studied that median of a triangle divides it into two triangles of equal areas. Verify this result for ΔABC whose vertices are $A(4, -6)$, $B(3, -2)$ and $C(5, 2)$.

Q44. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer:

$(-3, 5)$, $(3, 1)$, $(0, 3)$, $(-1, -4)$

Q45. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer:

$(4, 5)$, $(7, 6)$, $(4, 3)$, $(1, 2)$

Q46. Let $A(4, 2)$, $B(6, 5)$ and $C(1, 4)$ be the vertices of ΔABC.

(i) The median from A meets BC at D. Find the coordinates of the point D.

(ii) Find the coordinates of the point P on AD such that $AP : PD = 2 : 1$.

(iii) Find the coordinates of points Q and R on medians BE and CF respectively such that $BQ : QE = 2 : 1$ and $CR : RF = 2 : 1$.

(iv) What do you observe?

(Note: The point which is common to all the three medians is called the centroid and this point divides each median in the ratio 2 : 1.]

(v) If $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ are the vertices of ΔABC, find the coordinates of the centroid of the triangle.

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S1. Required point = (7, 3).

S2. Area of triangle = 24 sq. unit.

S3. 2 sq. unit.

S4. 0.

S5. $k = 0$.

S6. **Try yourself.**

S7. $x - y = 2$.

S8. $p = 7$.

S9. 39; 39km.

S10. Yes.

S11. $1:1$; $\left(-\frac{3}{2}, 0\right)$.

S12. $\left(2, -\frac{5}{3}\right)$; $\left(0, -\frac{7}{3}\right)$.

S13. $2:7$.

S14. (1, 3).

S15. – 9, 3.

S16. $3x + y - 5 = 0$.

S17. (– 7, 0).

S18. Champa is correct.

S19. No.

S20. (3, – 10).

S21. $\left(-\frac{2}{7}, -\frac{20}{7}\right)$.

S22. $x + 3y - 7 = 0$.

S23. (3, – 2).

S24. Right triangle.

S25. Proved.

S26. Required point = (0, 9).

S27. 2 : 7.

S28. (–1, 0) and (–4, 2).

S29. y-axis divides the line segment joining the points (5, – 6) and (–1, –4) in 5 : 1 and the point of intersection as $\left(0, -13/3\right)$.

S30. Area = 72 square units.

S31. ±4, $QR = \sqrt{41}$, $PR = \sqrt{82}$, $9\sqrt{2}$.

S32. $\sqrt{61}$ m ; 5^{th} line at a distance of 22.5 m

S33. $x = 6, \quad y = 3$.

S34. $\left(-1, \frac{7}{2}\right)$, $(0, 5)$, $\left(1, \frac{13}{2}\right)$.

S35. 24 sq. units.

S36. 1 sq. unit; 1 : 4.

S37. 28 sq. units.

S38. Square

S39. Rhombus.

S40. $\frac{15}{32}$ sq. units; 1 : 16.

S41. (1, 0), (1, 4).

S42. 2 : 9.

S43. Try yourself.

S44. No quadrilateral

S45. Parallelogram

S46. (i) $D\left(\frac{7}{2}, \frac{9}{2}\right)$. (ii) $P\left(\frac{11}{3}, \frac{11}{3}\right)$. (iii) $Q\left(\frac{11}{3}, \frac{11}{3}\right), R\left(\frac{11}{3}, \frac{11}{3}\right)$.

(iv) P, Q, R are the same point. (v) $\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$.