

COORDINATE GEOMETRY

CANSU OLCE

A STAR MATHS (www.astarmaths.com.au)

1. Find the distance between two points.
 - a) $M(8, -3)$ and $N(-1, 9)$
 - b) $P(-2, 1)$ and $Q(-14, -4)$

2. The points $A(t, t+2)$, $B(2, 3)$ and $C(4,0)$ are the vertices of an isosceles triangle with $AB=BC$. Find the possible values of t .

3. Find the distance between points $(3t, 2t)$ and $(0, 2t)$ in terms of t .

4. A point $P(m, n)$ is equidistant from point $A(2, -1)$ and point $B(3, 4)$. Express m in terms of n .

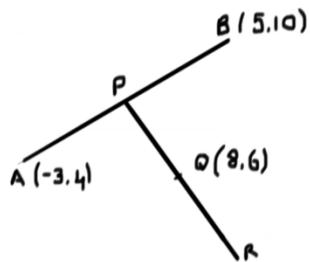
5. Given $A(2t, 3)$, $B(-1, 0)$ and $C(1, t)$ are three points such that the distance between A and B is twice the distance between B and C . Find the value of t .

6. Find the mid-point of a line joining each of the following pairs of points.
 - a) $A(2, -3)$ and $B(-7, -8)$
 - b) $P(t+1, -2)$ and $B(-5, 2t-4)$

7. Given M is a point on line joining point A(-3, 8) and point B(9, 4) such that $AM=MB$. Find the coordinates of point M.

8. Given T(3, 1) is the midpoint of a line joining points P(-5,-8) and Q. Find the coordinates of Q.

9.



In the diagram, P is the midpoint of AB and Q is the midpoint of PR. Find the coordinates of point R.

10. Given P(7,0), Q(-4,-2) and R(6,3) are three vertices of a parallelogram PQRS. Find
a) the coordinates of the midpoint of PR
b) the coordinates of point S.

11. Given P is a point on the straight line AB and divides AB according to the ratio given below. Find the coordinates of P in each case.

a) $A(3, -1)$, $B(-2, 5)$ and $AP:PB=1:2$

b) $A(-4, 5)$, $B(2, -3)$ and $AP:PB=3:1$

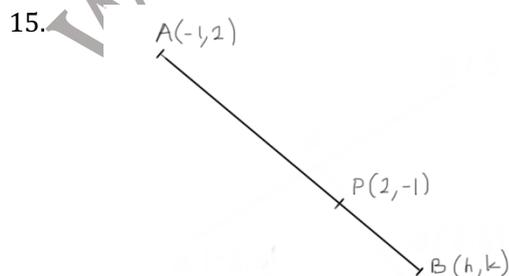
12. Given $M(-2, -1)$ is a point on the line joining point $F(-8, 5)$ and point G such that $FM:MG=2:3$. Find the coordinates of G .

13. Given R is a point on the line joining point $M(3,7)$ and point $N(9,1)$ such that $MR=2RN$. Find the coordinates of R .

14. Given $A(-5, 2)$, $B(1, p)$ and $C(3, 10)$ are three points on a straight line. Find

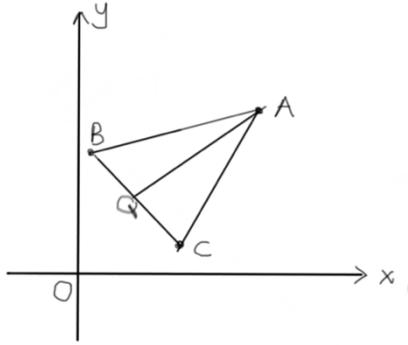
a) the ratio of AB to BC .

b) the value of p .



In the diagram, point P divides AB such that $AP:PB=3:2$. Find the values of h and k .

16.



In the diagram, the coordinates of points A, B and P are (10, 12), (1, 9) and (6, 8) respectively. Given that $AP=2PQ$ and Q is the midpoint of BC, find the coordinates of Q and C.

17. Find the area of each polygon with the following vertices.

a) A(1, 2), B(-3, 4), C(5,7)

b) P(1, -3), Q(-2,0), R(2,3), S(4, -1)

18. A (-2, 1), B(0, -3) and C(4, t+3) are the vertices of a triangle with an area of 8 unit^2 . Find the possible values of t.

19. A triangle with vertices P(k+1, k), Q(-1,2) and R(3, -1) has an area of 15 unit^2 . Find the possible value of k.

20. Find the area of a triangle ABC with vertices A(-2,-1), B(1,0) and C(4, 1). Hence, make a conclusion concerning points A, B and C from the area obtained.

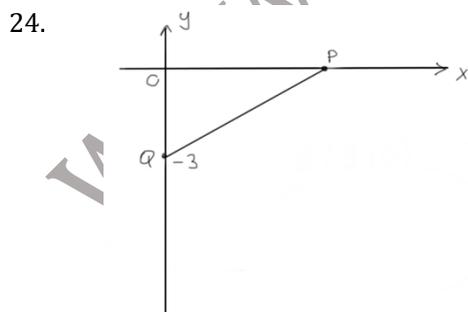
21. The coordinates of points A, B and C are (3,12), (6,1) and (-2,7) respectively.

a) Find the area of a triangle ABC.

b) Hence, find the perpendicular distance from A to BC.

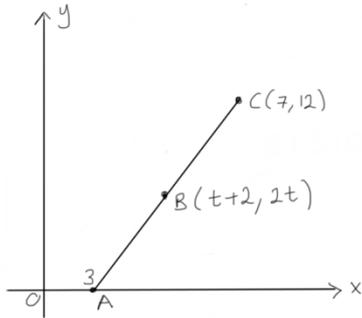
22. A straight line that passes through points A(p+3, 2p) and B(2p-1, p+4) has a gradient of $\frac{1}{3}$. Find the value of p.

23. P(3a, 2a-5), Q(-2, 1) and R(3, 4) are three points lying on a straight line. Find the value of a.



In the diagram, the gradient of PQ is $\frac{1}{2}$. Find the coordinates of point P.

25.



In the diagram, ABC is a straight line. Find the value of t .

26. $A(2,7)$, $B(1,0)$ and $C(5,8)$ are three given points. Find the equation of the straight line that passes through point A and the midpoint of BC.

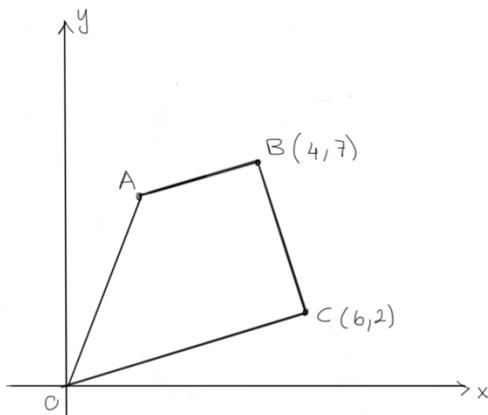
27. A straight line passing through point $(5, 6)$ has an x-intercept at 2.

- Find the equation of the straight line.
- Hence, state the y-intercept of the straight line.

28. Given $6x - py + q = 0$ is the equation of a straight line with gradient 3 and y-intercept -4. Find the values of p and q .

29. A straight line $\frac{x}{7} + \frac{y}{4} = 1$ intersects the x-axis at point P and the y-axis at point Q. Find the midpoint of the straight line PQ.
30. Find the point of intersection of the two straight lines, $2x+3y-5=0$ and $y=2x+3$.
31. Given the straight line $px+3qy=-7$ intersects the straight line $2px+qy=1$ at point $(-1,2)$. Find the values of p and q.
32. The following are the equations of three straight lines:
$$\frac{4}{3}x - 2y = 6$$
$$\frac{x}{12} - \frac{y}{8} = 1$$
$$x - 2y - 9 = 0$$
Determine which two lines are parallel to each other.
33. P and Q are two points with coordinates $(-1, -2)$ and $(3, -5)$ respectively. Find the equation of the straight line that passes through point $(1, 3)$ and is parallel to the straight line PQ.

34.



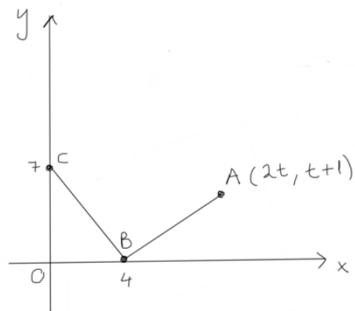
In the diagram, OABC is a trapezium with AB parallel to OC and O is the origin. Find the equation of AB.

35. Find the equation of a straight line that passes through point $(-3, 5)$ and is parallel to the straight line $\frac{x}{2} + \frac{3}{4}y = 3$.

36. Given $\frac{2}{3}y - \frac{x}{6} = 4$ and $\frac{x}{2} + \frac{y}{8} = 1$ and $2x + 8y - 16 = 0$ are the equations three straight lines. Determine which two lines are perpendicular to each other.

37. Given $P(p+6, -4)$ $Q(7, -3)$ and $R(9, -p)$ are three points such that PQ is perpendicular to QR. Find the value of p.

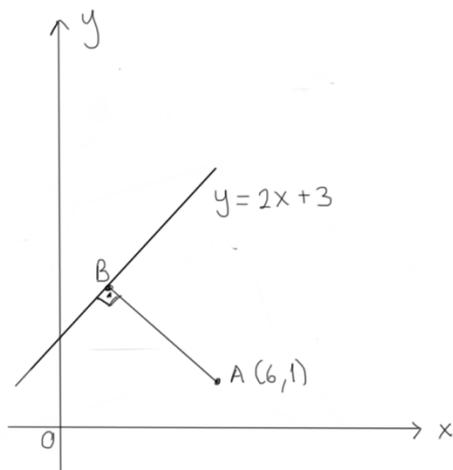
38.



In the diagram, AB is perpendicular to BC. Find the value of t .

39. Find the equation of the straight line that passes through point $(-3, 9)$ and is perpendicular to the straight line $\frac{1}{2}x + \frac{7}{6}y = 4$.

40.



In the diagram, AB is perpendicular to the straight line $y=2x+3$

- Find the equation of AB.
- Hence, find the coordinates of AB.

ANSWER KEY

1. a) 15 units
b) 13 units
2. $t = -1$ or 4
3. $5t$
4. $m = 10 - 5n$
5. $t = 3/2$
6. a) $(-5/2, -11/2)$
b) $(\frac{t-4}{2}, t - 3)$
7. M(3,6)
8. Q(11,10)
9. R(15, 5)
10. a) $(13/2, 3/2)$
b) (17, 5)
11. a) $(4/3, 1)$
b) $(1/2, -1)$
12. G(7, -10)
13. R(7, 3)
14. a) 3:1
b) $p = 8$
15. $h = 4, k = -3$
16. Q(4, 6), C(7, 3)
17. a) 14 units²
b) $36/2$ units²
18. $t = -6$ or -22
19. $k = -4$ or $32/7$
20. 0 units²; ABC is a straight line
21. a) 35 units²
b) 7 units
22. $p = 4$
23. $a = 36$
24. P(6,0)
25. $t = 3$
26. $y = -3x + 13$
27. a) P(3,0), Q(0,2)
28. $y = 2x - 4$

29. $p=2, q=-8$

30. $(7/2, 2)$

31. $(-1/2, 2)$

32. $p=-2, q=-3/2$

33. $\frac{4}{3}x - 2y = 6$ and $\frac{x}{12} - \frac{y}{8} = 1$

34. $y = -\frac{3}{4}x + \frac{15}{4}$

35. $x - 3y + 17 = 0$

36. $y = -\frac{2}{3}x + 3$

37. $\frac{2}{3}y - \frac{x}{6} = 4$

38. $p=5/3$

39. $y = \frac{7}{3}x + 16$

40. a) $y = -\frac{x}{2} + 4$

b) $B(2/5, 19/5)$

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