CAPRA COACHING

**Year 9 Exam Booklet:**
Coordinate Geometry

**Coordinate Geometry** **Name: ……**

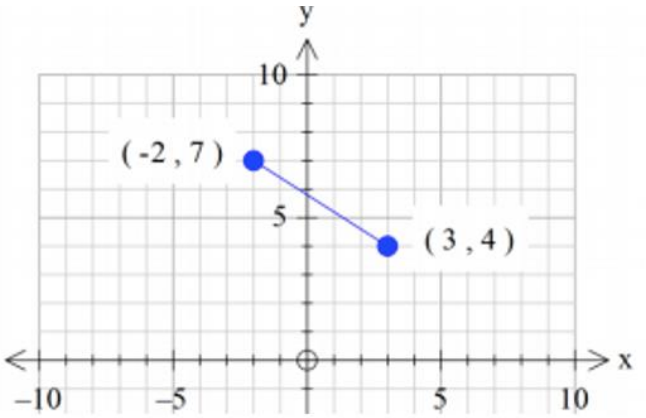
## Easy

1. For the linear relationship $y = -2x - 6$:

   (i) State the gradient.

   (ii) Find the x- and y- intercepts.

2. Find the midpoint of the line segment in the diagram below:



**Coordinate Geometry** **Name: ……**

3. Find the gradient of the line PQ if P and Q are the points $(7, -6)$ $and$ $(3, 2)$.

4. For the points $A(-6, 5)$ $and$ $B(-1,5)$ find:

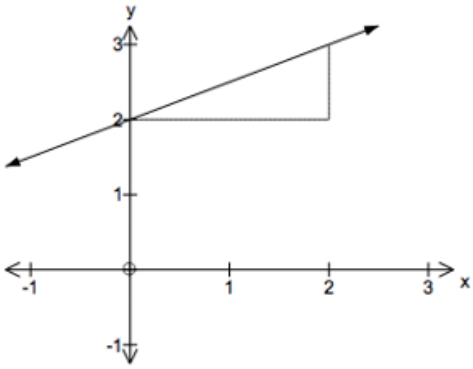
   (i) the exact length AB.

   (ii) the gradient of AB.

   (iii) the midpoint of AB.

**Coordinate Geometry** **Name: ……**

5.




a) What is the equation of the line in the diagram above?

b) On the number plane above sketch the line $y = 2 - x$.

**Coordinate Geometry** **Name: ……**

6. The point $(n, 2)$lies on the line $y = 2x - 6$. Find the value of n.

7. Find the distance between points $(4, 5) and\ (-6, 3)$ to 3 significant figures.

8. Find the gradient of the straight line which is perpendicular to the straight line $4x + 3y - 7 = 0$

**Coordinate Geometry** **Name: ……**

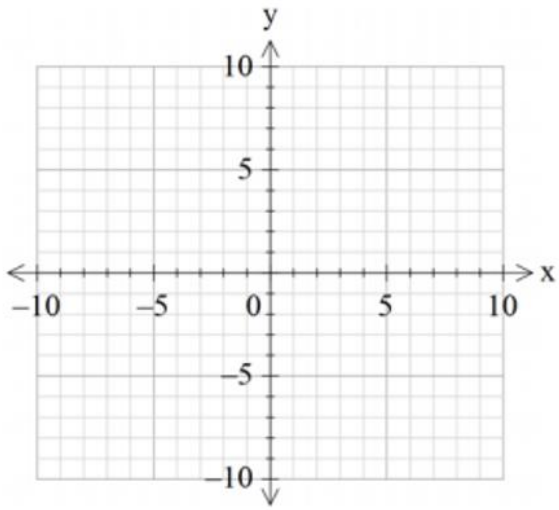
9. Find the equation of a line that has a gradient of -2 and passes through the point $-3, 5$.

10. Find the midpoint between $(4, 2)$ $and$ $(10, 10)$.

**Coordinate Geometry** **Name: ……**

11. (i) Make y the subject of the equation.

(ii) Sketch $2y - 8x = 0$ on the Cartesian plane.



**Coordinate Geometry** **Name: ……**

12. The triangle ABC has vertices $A(0,7)$, $B(3,-2)$ $and$ $C$ $(-8,5)$.

(i) Find the exact length of side AB.

(ii) Find the gradient of BC.

(iii) Find the midpoint of AC

**Coordinate Geometry** **Name: ……**

13. Find the equation of the line parallel to $y = 2x + 1$ with y- intercepts $(0, 3)$.

14. Given $A(3, -7)$ $and$ $B$ $(2, -1)$, find

(i) the gradient of AB.

(ii) the midpoint of AB.

**Coordinate Geometry** **Name: ……**

## Medium

15. Determine the equation of the line that has a gradient of 10 and passes through the point $\left(\frac{1}{2}, -7\right)$. Leave your answer in $y = mx + b$ form.

16. The line $4x + 3y - 7 = 0$ passes through the point $(-2, k)$. Find the value of k.

**Coordinate Geometry** **Name: ……**

17. For the points $A(0,-2)$ $and$ $B$ $(3,7)$, find

(i) the distance AB.

(ii) the midpoint of interval AB.=

18. If (3,2) is the midpoint of the line PQ on the number plane, and P has co-ordinate $(5,9)$, find the co-ordinates of Q.

**Coordinate Geometry** **Name: ……**

19. On the number plane below, sketch the lines $y = 2x - 4$ *and* $y = -x + 3$. Label each line and clearly indicate the x-intercept and y-intercept for each line.

20. $A\ (-2, 2), B(1,2)$ as shown. Find:

(i) distance AB.

(ii) gradient of AB=

(iii) the equation of line AB.

**Coordinate Geometry** **Name: ……**

21. (i) Write down the gradient of the line $y = \frac{3}{4}x - 2$

(ii) Is the line $y = \frac{3}{4}x - 2$ parallel to AB or perpendicular to AB or neither?

Explain your answer.

22. (i) Find the point on the line $3x - 5y = 6$ where it crosses the x-axis.

(ii) Hence find the equation of the line which passes through the x intercept of the line $3x - 5y = 6$ and which is perpendicular to that line. Give your answer in general form.

**Coordinate Geometry** **Name: ……**

23. $A(-3,5) and\ B(3,1)$.

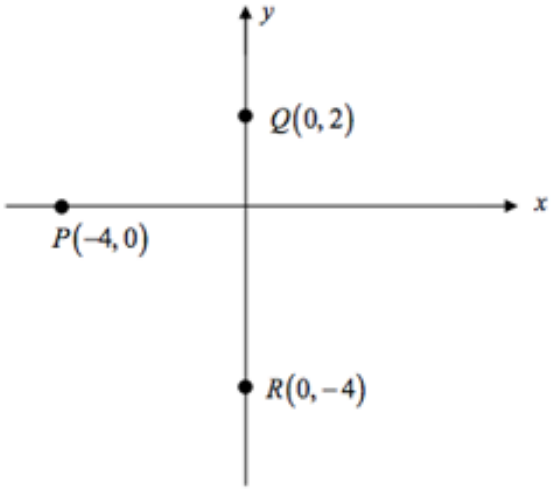
(i) Find the midpoint of AB.

(ii) Find the gradient of AB.

(iii) Hence find the equation of the perpendicular bisector of AB.

**Coordinate Geometry** **Name: ……**

24. The co-ordinates of points P, Q and R are The co-ordinates of points P, Q and R are $(-4,0), (0,2)$ *and* $(0,-4)$ respectively.




(i) Find the gradient of the interval PQ.

(ii) Find the equation of the line parallel to PQ and passing through R.

**Coordinate Geometry** **Name: ……**

(iii) Find the co-ordinates of S such that PQRS is a parallelogram.

(iv) Find the area of parallelogram PQRS.

25. Find, in general form, the equation of the straight line with gradient $-\frac{4}{5}$ passing through the point $(2, -3)$.

**Coordinate Geometry** **Name: ……**

26. $M(3,-5)$ is the midpoint of the interval AB. Given A has co-ordinates (7,7) find the co-ordinates of B.

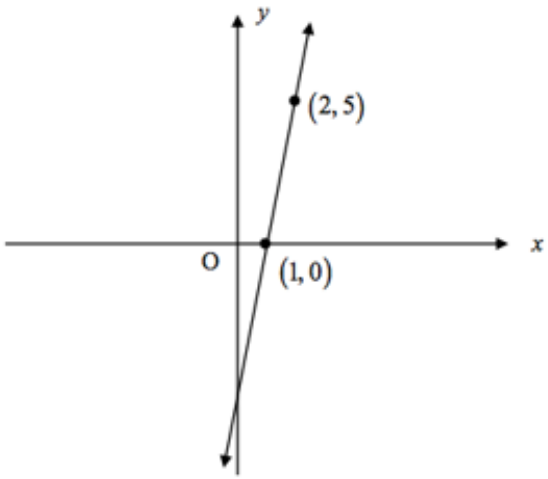
27. The vertices of a triangle are $A(-2,-2), B(2,6) and\ C(6,2)$.

    (i) Prove that the triangle is isosceles.

    (ii) Name the equal angles in the triangle.

**Coordinate Geometry** **Name: ……**

28. The line, $l$, is shown in the diagram below.




(i) Find the gradient of line $l$.

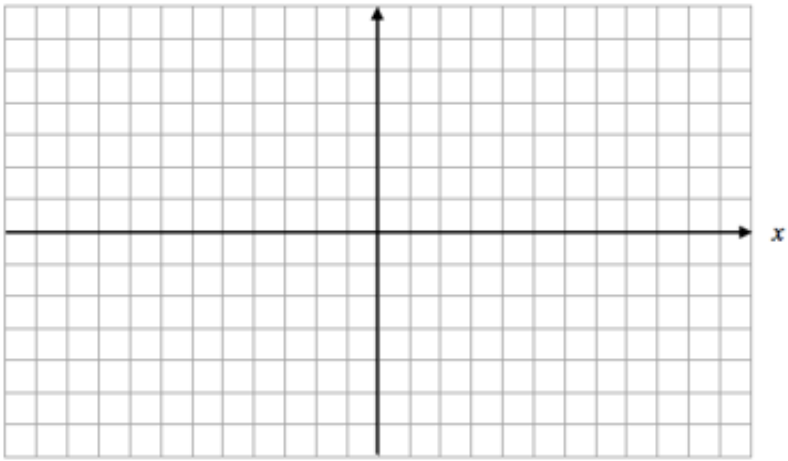
(ii) State the equation of the line $l$.

(iii) Give an equation of a line that is parallel to line $l$.

**Coordinate Geometry** **Name: ……**

29. The vertices of a triangle are $A(3,7), B(0,2) amd\ C(6,2)$.

Plot and join these points on the number plane.



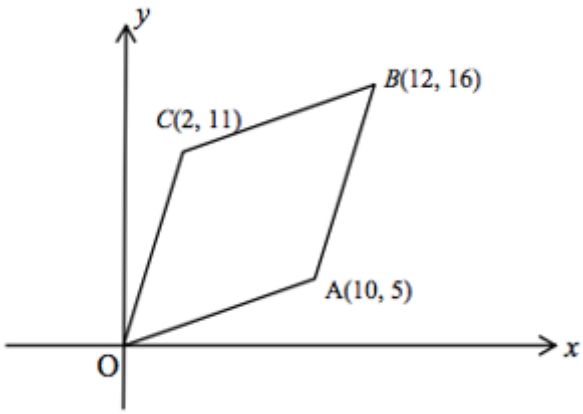

(i) Find the midpoint M of BC.

(ii) State the equation of the line joining B to C.

(iii) Find the gradient of AB.

**Coordinate Geometry** **Name: ……**

30. In the diagram A, B and C are the points $(10,5), (12,16) and\ (2,11)\ respectively$.




(i) Find the distance AC.

(ii) Find the midpoint of AC.

**Coordinate Geometry** **Name: ……**

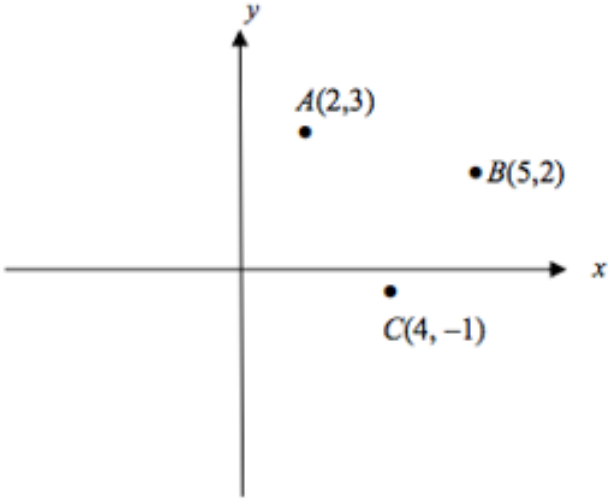
31. (i) Show that OB is perpendicular to AC.

(iii) Find the midpoint of OB and hence explain why OABC is a rhombus.

(iv) Hence, or otherwise, find the area of OABC.

**Coordinate Geometry** **Name: ……**

32.




The points $A(2,3), B(5,2) and\ \ C(4,-1)$ are shown on the above diagram.

(i) Find the co-ordinates of $E$, the midpoint of $AC$.

(ii) $E$ is also the midpoint of $BD$. Find the co-ordinates of $D$.

(iii)

**Coordinate Geometry** **Name: ……**

(iv) Show that $AE \perp EB$

(v) Show that the equation of $AB$ is $x + 3y - 11 = 0$

**Coordinate Geometry** **Name: ……**

33. $ABC$ is a triangle with vertices $A(1,3), B(0,5) and\ \ C(0,0)$.

(i) Draw the triangle $ABC$ in the number plane.

(ii) Find the area of $\Delta ABC$.

(iii) Write down the equation of the line passing through $A$, the parallel to the y-axis.

**Coordinate Geometry** **Name: ……**

(iv) Find the length of the side $AB$.

(v) Find the gradient of the line $AB$.

(vi) Find the equation of the line $AB$.

**Coordinate Geometry** **Name: ……**

34. Point $A(3,2)$, Point $B(-3,-3)$ and Point $C(0,-5)$ are the points on a Cartesian plane.

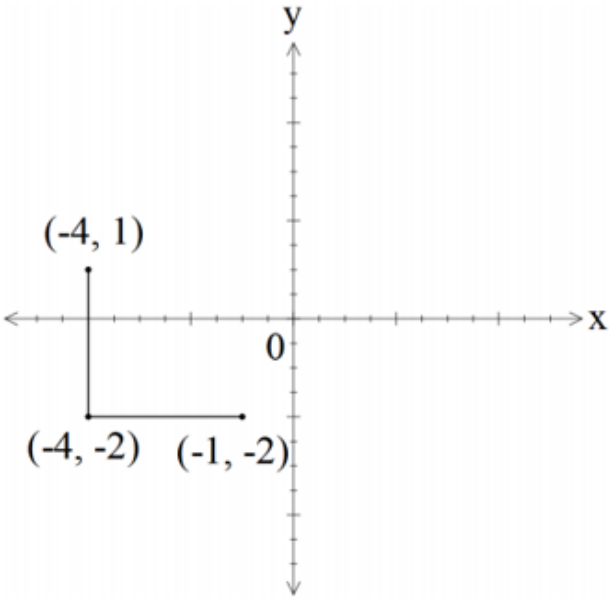
    (i) Find the midpoint of the interval BC.

    (ii) Hence or otherwise, find the equation of the line passes through Point A, and the Point b and Point C.

35. A line joining $(m, 2)$ and $(4, n)$ has a midpoint of $(1,6)$. Find the values of the pronumerals.

**Coordinate Geometry** **Name: ……**

36. Consider the number plane below.




What are the possible set of co-ordinates $(x, y)$ that would close the shape and have an area of 15 square units?

**Coordinate Geometry** **Name: ……**

37. Find the equation of the line passing through the point $(3,5)$ which is parallel to the line $y = 2x + 7$.

38. Find the equation of the line that passes through the points $(2, -5)$ and $(-4,13)$.

**Coordinate Geometry** **Name: ……**

39. $O(0,0)$, $A(0,-8)$ and $B(6,0)$ are the points on a number plane.

(i) If $D(3,0)$ is the midpoint of interval $AC$ show that the coordinates of $C$ are $(6,8)$.

(ii) Represent the above information on a labelled number plane and then show that the equation of line $AC$ is given by $8x - 3y - 24 = 0$.

**Coordinate Geometry** **Name: ……**

40. Find $k$ if $(1, -3)$ lies on the line with equation $2x - ky + 3 = 0$

41. $A(-2,3)$ and $B(3, -1)$ are the points on the Number Plane. The line $l$ is perpendicular to $AB$ passing through $C(-3,2)$.

    (i) Calculate the distance $AB$ and gradient of $AB$. Leave your answer in exact form.

    (ii) Find the equation of the line $l$, in general form.

**Coordinate Geometry** **Name: ……**

## Hard

42. Triangle $ABC$ has vertices $A(1,2), B(3,-1)$ and $C(-1,-1)$. Show that triangle $ABC$ is an isosceles triangle.

43. The line $3x + 2y = 18$ intersects the x-axis at $A$ and the y-axis at $B$. Let $O$ origin. Find the area $\Delta AOB$.

**Coordinate Geometry** **Name: ……**

44. The line $y = 3x - 1$ is perpendicular to the line $ax + 6y - 5 = 0$. Find the value of $a$.

45. (i) On a number plane, clearly label the points $A(2,1)$ and $B(6,-1)$. (You may add to this diagram as the equation progresses if necessary)

(ii) Show that $M$, the midpoint of $AB$, has the coordinates $(4,0)$.

**Coordinate Geometry** **Name: ……**

(iii) Show that $l_1$, the perpendicular bisector of $AB$ given by $2x - y - 8 = 0$.

46. (i) Show that $C(5,2)$ lies on $l_1$.

(ii) Is $\Delta ABC$ an equilateral, isosceles or scalene triangle? Justify your answer.

**Coordinate Geometry** **Name: ……**

47. Find the coordinates of D, such that $ABCD$ is a parallelogram. Show all necessary working.

48. B is the point $(p, 0)$ on the x-axis. A vertical line is drawn from $B$ and cuts the line $3x + 2y - 18 = 0$ at the point $A$.

(i) Find the coordinates of $A$ in term of $p$.

(ii) The triangle bounded by $AB$, the line $3x + 2y - 18 = 0$ and the x-axis has an area of 12 $units^{\,2}$, Find the possible coordinates of $A$.

**Coordinate Geometry** **Name: ……**

49. $OABC$ is a quadrilateral with vertices $O(0,0), A(10,10), B(8,24)$ and $C(-2,14)$.

(i) Prove that $OC \parallel AB$.

(ii) Prove that $OC = AB$.

(iii) Prove that $OC \perp AB$.

(iv) What type of quadrilateral is $OABC$? (Give reason)