4.1 – 4.6 – Coordinate Geometry

Student name: _____ Answers _____ Score: _____

1. The co-ordinates of three points are $A(-2, 6)$, $B(6, 2)$ and $C(-2, -2)$.

   (a) Find the gradient of AB.

   ....$-\frac{1}{2}$.............. [1]

   (b) D is the midpoint of AB.

   By using gradients show that the straight lines AB and CD are not perpendicular.

   D(2, 4), gradient CD $= \frac{6}{4}$ is not negative reciprocal of AB [3]

2. P is the point $(-2, 5)$ and Q is the point $(4, 1)$.

   (a) Find the co-ordinates of the midpoint of PQ.

   (....1...... , ...3......) [1]

   (b) Find the gradient of PQ.

   ....$-\frac{2}{3}$........... [2]

   (c) **(i)** Find the equation of the line perpendicular to PQ which passes through the point $(0, 4)$.

   $y = \frac{3}{2}x + 4$
   .... [2]

   (ii) Find the x co-ordinate of the point where this line cuts the x-axis.

   $x =$..........$-\frac{8}{3}$.......... [1]

3. A is the point $(2, 8)$ and B is the point $(6, 0)$.

   (a) Find the co-ordinates of the midpoint of AB.

   (.4...... , .4......) [1]

   (b) Find the gradient of AB.
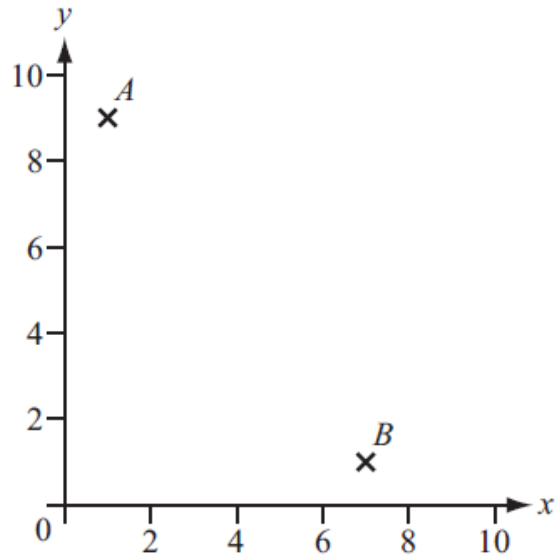
   ....-2............. [2]

4. The point A has co-ordinates $(2, 8)$ and the point B has co-ordinates $(6, 6)$.

   Find the equation of the perpendicular bisector of the line AB.

   $y = 2x - 1$
   .... [4]

5. The points A (1, 9) and B (7, 1) are shown on the diagram below.

(a) Calculate the length AB.

………………10……………… [2]

(b) (i) Find the co-ordinates of the midpoint of the line AB.

(….4……… , 5………) [1]

(ii) Find the equation of the perpendicular bisector of the line AB.

……………$y - 5 = \frac{3}{4}(x - 4)$……………… [3]

6. The gradient of the line joining the points (2, 1) and (6, a) is $\dfrac{3}{2}$.

Find the value of a.

$a =$ ……7……………… [3]

7. Find the equation of the straight line passing through $(-2, -4)$ and $(2, 0)$.

…………$y = x - 2$…… [3]

8. A is the point $(-4, 4)$ and B is the point $(4, 10)$.

Find the equation of the perpendicular bisector of AB.

…………$y = -\frac{4}{3}x + 7$………… [4]

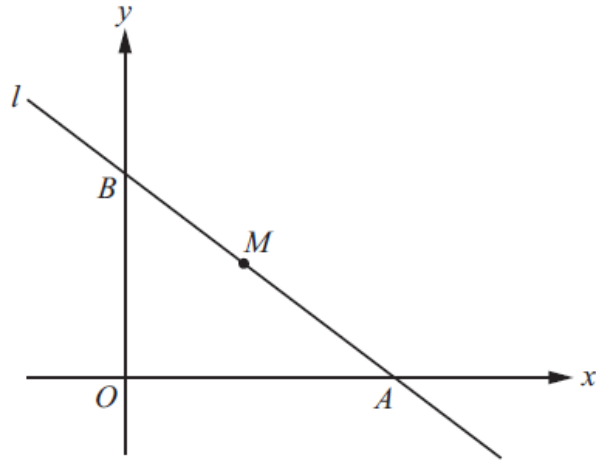**9.** The point A has co-ordinates (1, 3) and the point B has co-ordinates (4, 1).
B is the midpoint of the line AC.

Find the co-ordinates of the point C.

(…………7………… , …………-1…………) [2]

10.

NOT TO SCALE

The equation of the line *l* is $3x + 4y = 12$.
The line cuts the *x*-axis at *A* and the *y*-axis at *B*.
The midpoint of *AB* is *M*.

(a) Find the co-ordinates of

    (i) *A*,

(....4...... , ..0.....) [1]

    (ii) *B*,

(....0...... , ..3.....) [1]

    (iii) *M*.

(....2...... , ..1.5..) [1]

(b) Find the equation of the line through the origin which is perpendicular to the line *l*.

$y = \frac{4}{3}x$

.... [3]

11. The gradient of the line joining the points $(2, 1)$ and $(6, a)$ is $\frac{3}{2}$.

Find the value of *a*.

$a = $ ....7............. [3]

12. The equation of a line passing through the point $(2, 3)$ is $ax + by = d$, where $a, b, d \in \mathbb{N}$.
This line is perpendicular to the line $y = 2x + 5$.

Find the values of *a*, *b* and *d*.

$a = $ ....1...............
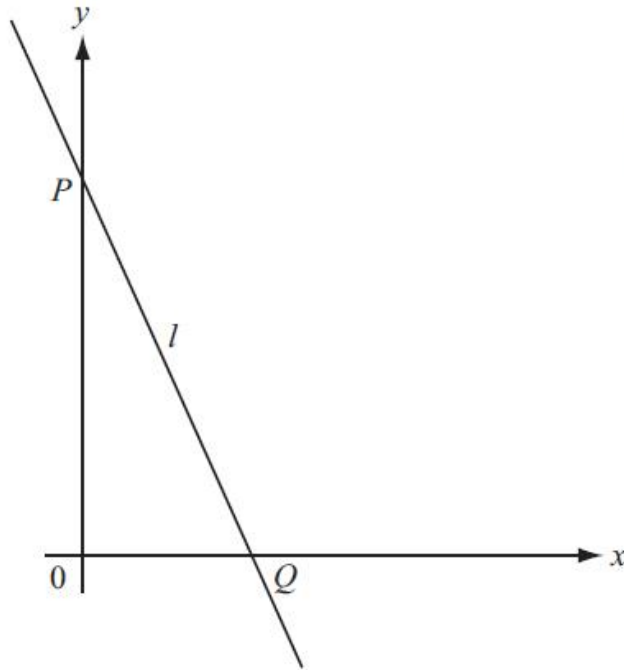
$b = $ ....2...............

$d = $ ...8............... [3]

13. The equation of a straight line is $3x + 4y = 12$.

Write the equation in the form $y = mx + c$.

$y = $ ...$-\frac{3}{4}x + 3$............ [2]

14.

NOT TO SCALE

The diagram shows a line, l, which passes through the points $P(0, 4)$ and $Q(2, 0)$.

(a) Find the equation of the line l.

$y = -2x + 4$ [2]

(b) Find the equation of the line which is perpendicular to l and passes through the midpoint of PQ.

$y = \frac{1}{2}x + \frac{3}{2}$ [4]

15. A is the point $(3, 11)$ and B is the point $(7, 3)$.

Find the equation of the line AB, giving your answer in the form $y = mx + c$.

$y = -2x + 17$ [3]

16. The point A has co-ordinates $(3, 8)$.
The point B has co-ordinates $(7, 0)$.

(a) Find the co-ordinates of the midpoint of AB.

(5 , 4) [1]

(b) Find the equation of the perpendicular bisector of AB.
Write your answer in the form $y = mx + c$.
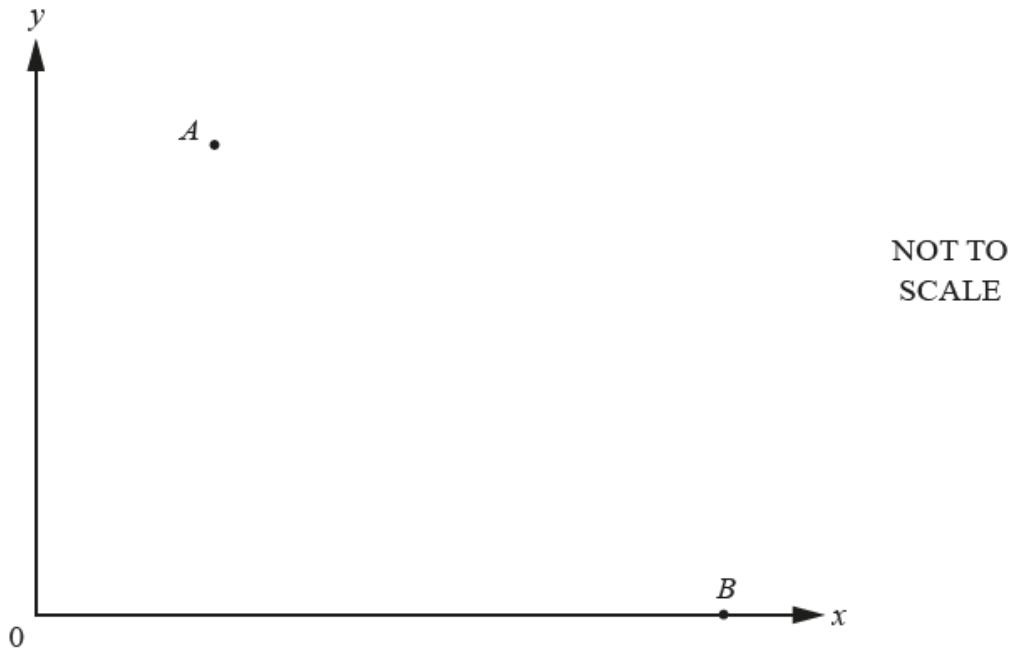
$y = -\frac{1}{2}x + 1\frac{1}{2}$ [3]

17. A is the point $(1, 8)$ and B is the point $(5, 0)$.

Find the equation of the perpendicular bisector of AB in the form $y = mx + c$.

$y = \frac{1}{2}x + \frac{5}{2}$ [4]

4

18. The points A (3, 8) and B (9, 0) are shown on the diagram below.

NOT TO SCALE

Find the equation of the perpendicular bisector of the line AB.

$4y = 3x - 2$ .... [5]

19. Point A has co-ordinates (2, 12). Point B has co-ordinates (4, 2).

Find the co-ordinates of the midpoint of AB.

(......... 3 .... , ... 7 ....) [2]

20. Point A has co-ordinates (2, 3). Point B has co-ordinates (4, 11).

Find the equation of the line AB.
Give your answer in the form $y = mx + c$.

$y = $ .... $4x - 5$ .... [3]

21. A is the point (1, 7) and B is the point (4, 13).

Find the equation of the perpendicular bisector of AB in the form $y = mx + c$.

$y = $ .... $-0.5x + 11.25$ .... [5]

22. Find the equation of the line parallel to the line $y = 3 - x$ that passes through the point (0, 7).

$y = 7 - x$ .... [2]

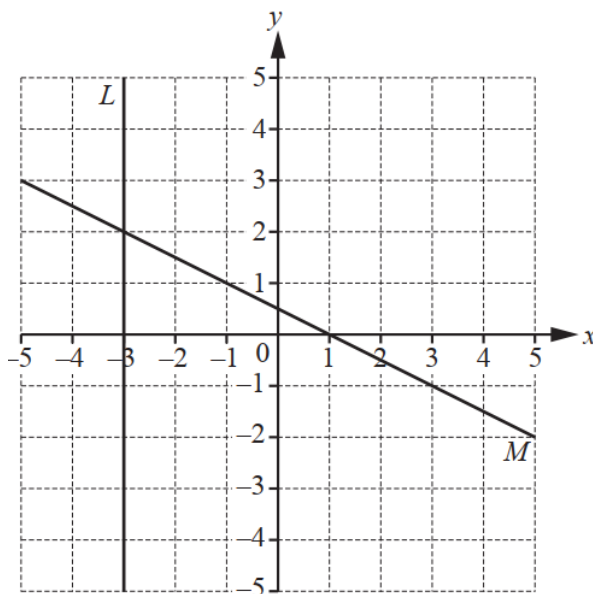**23.** A is the point (–1, 13) and B is the point (3, 1).

Find the equation of the line AB, giving your answer in the form $y = mx + c$.

$y = $ .... $- 3x + 10$ .... [3]

24.

(a) Write down the equation of line L.

.... $x = -3$ .... [1]

(b) Write down the co-ordinates of the point of intersection of line L and line M.

(.......... -3 .... , ... 2 ....) [1]

(c) Find the gradient of line M.
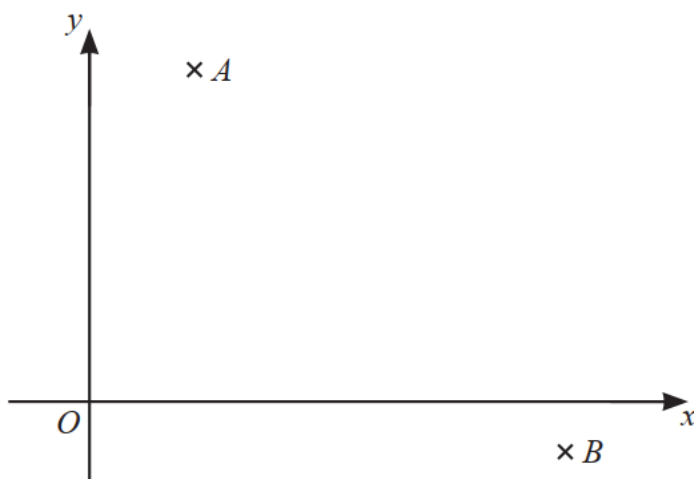
$-\dfrac{1}{2}$

.... [2]

25. A is the point $(-2, 4)$ and B is the point $(7, 1)$.

Find the length of AB giving your answer in its simplest surd form.

$3\sqrt{10}$

.... [4]

26.

NOT TO SCALE

The points A $(2, 8)$ and B $(6, -2)$ are shown on the diagram.

Find the equation of the perpendicular bisector of the line AB.
Give your answer in the form $y = mx + c$.

$y = $ $\dfrac{2}{5}x + \dfrac{7}{5}$ .... [5]

27. A is the point $(-5, 7)$ and C is the point $(1, -2)$.

(a) B is the mid-point of AC.

Find the coordinates of B.

(....__−2__...... , ...__2.25__..........) [2]

(b) The line CD is perpendicular to the line AC.

Find the equation of line CD.

$$y = \frac{2}{3}x - \frac{8}{3}$$ [4]

28. A is the point $(3, 6)$ and B is the point $(-5, 10)$.

(a) Work out the co-ordinates of the midpoint of AB.

(....__−1__.......... , ...__8__..........) [2]

(b) Find the length of AB, giving your answer in the form $a\sqrt{5}$.

...............__$4\sqrt{5}$__.............. [3]

29. The point A has co-ordinates $(1, 9)$. The point B has co-ordinates $(4, 5)$.

Find the length of AB.

...............__5__.............. [2]

30. Find the equation of the straight line perpendicular to the line $y = 2x + 1$ that passes through the point $(2, 5)$.
Give your answer in the form $y = mx + c$.

$y = $ ....__$-\frac{1}{2}x + 6$__............ [3]

31. A is the point $(0, 8)$ and B is the point $(6, 0)$.
The line L passes through B and is perpendicular to AB.

Find the equation of L.

$$y = \frac{3}{4}x - \frac{9}{2}$$ [4]

32. The point A has co-ordinates $(1, -5)$ and the point B has co-ordinates $(9, 1)$.

Find the equation of the perpendicular bisector of AB in the form $y = mx + c$.

$y = $ ....__$-\frac{4}{3}x + \frac{14}{3}$__.......... [5]

33. The equation of the line L is $y = 3x - 2$.

(a) Find the co-ordinates of the point A, where the line L crosses the y-axis.

(....__0__........ , ...__−2__........) [1]

(b) Find the co-ordinates of the point B, where the line L crosses the x-axis.

(....__$\frac{2}{3}$__........ , ...__0__........) [1]

(c) The line M passes through the point A and is perpendicular to the line L.

Find the equation of the line M.

$$y = -\frac{1}{3}x - 2$$ [2]

34. A is the point $(1, 7)$ and B is the point $(4, 1)$.

Find the equation of the perpendicular bisector of AB in the form $y = mx + c$.

$y = $ .... $\frac{1}{2}x + \frac{11}{4}$ .... [5]

35. A is the point $(3, 7)$ and B is the point $(9, -1)$.

Calculate the length AB.

$AB = $ .... 10 .... [3]

36. A is the point $(1, 11)$ and B is the point $(4, 5)$.

Find the equation of the perpendicular bisector of AB.
Give your answer in the form $y = mx + c$.

$y = $ ..... $\frac{1}{2}x + \frac{27}{4}$ .... [5]