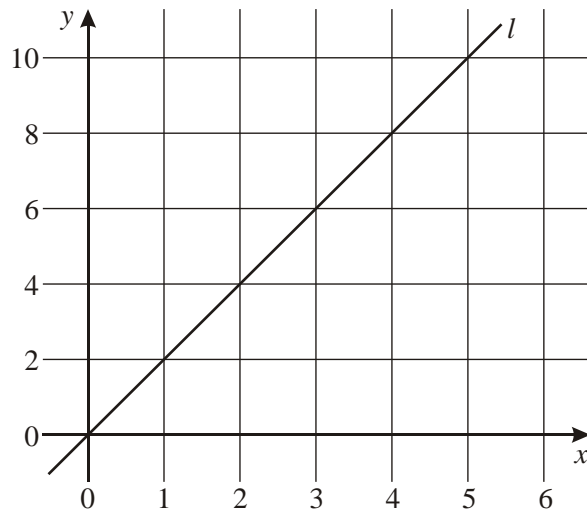


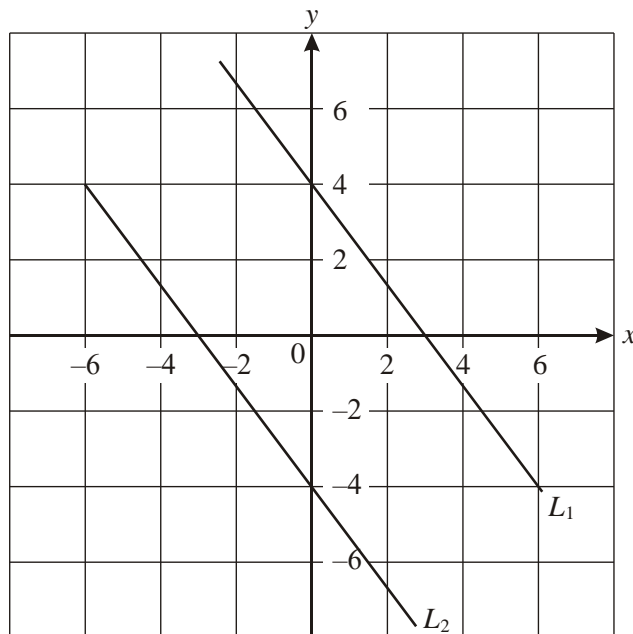
1. The following diagram shows a straight line l .



- (a) Find the equation of the line l .
- (b) The line n is parallel to l and passes through the point $(0, 8)$. Write down the equation of the line n .
- (c) The line n crosses the horizontal axis at the point P. Find the coordinates of P.

(Total 4 marks)

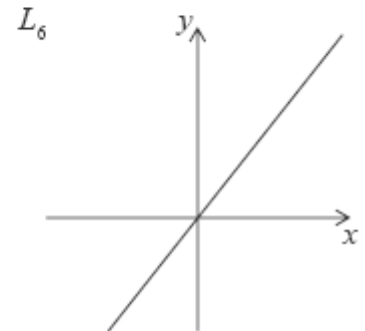
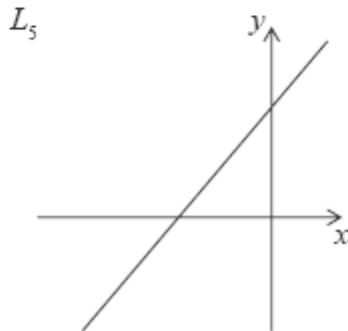
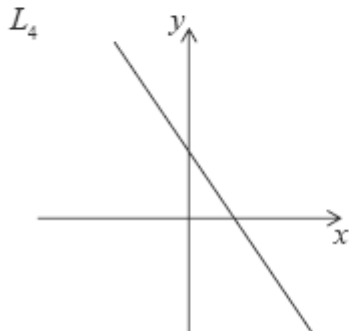
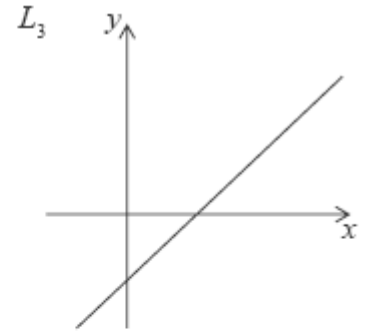
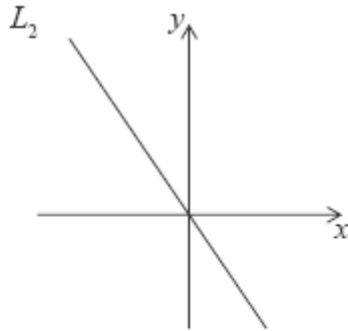
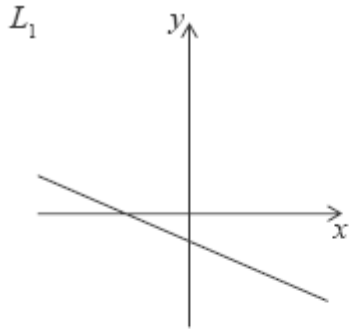
2. In the diagram, the lines L_1 and L_2 are parallel.



- (a) What is the gradient of L_1 ?
- (b) Write down the equation of L_1 .
- (c) Write down the equation of L_2 in the form $ax + by + c = 0$.

(Total 4 marks)

3. The following diagrams show six lines with equations of the form $y = mx + c$.



In the table below there are four possible conditions for the pair of values m and c . Match each of the given conditions with one of the lines drawn above.

Condition	Line
$m > 0$ and $c > 0$	
$m < 0$ and $c > 0$	
$m < 0$ and $c < 0$	
$m < 0$ and $c < 0$	

(Total 6 marks)

4. The straight line, L_1 , has equation $y = -\frac{1}{2}x - 2$.

(a) Write down the y intercept of L_1 .

(1)

(b) Write down the gradient of L_1 .

(1)

The line L_2 is perpendicular to L_1 and passes through the point $(3, 7)$.

(c) Write down the gradient of the line L_2 .

(1)

(d) Find the equation of L_2 . Give your answer in the form $ax + by + d = 0$ where $a, b, d \in \mathbb{Z}$.

(3)

(Total 6 marks)

5. The diagram below shows the line PQ, whose equation is $x + 2y = 12$. The line intercepts the axes at P and Q respectively.

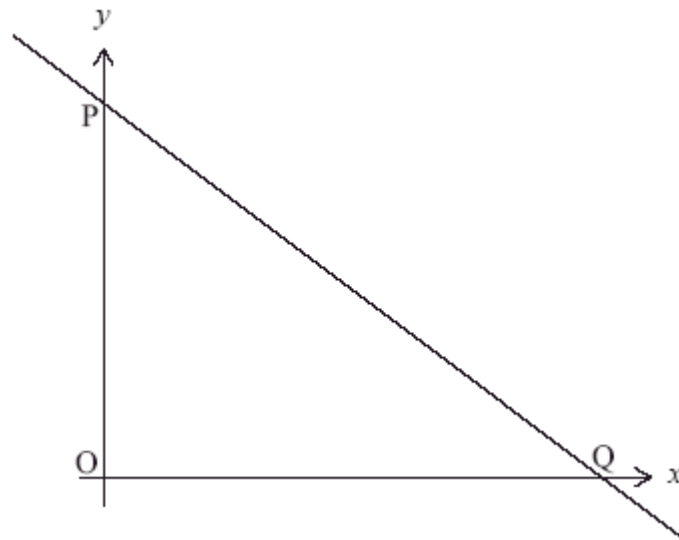


diagram not to scale

- (a) Find the coordinates of P and of Q. (3)
- (b) A second line with equation $x - y = 3$ intersects the line PQ at the point A. Find the coordinates of A. (3)
- (Total 6 marks)

6. The straight line L passes through the points $A(-1, 4)$ and $B(5, 8)$.

- (a) Calculate the gradient of L . (2)
- (b) Find the equation of L . (2)

The line L also passes through the point $P(8, y)$.

- (c) Find the value of y . (2)
- (Total 6 marks)

7. A straight line, L_1 , has equation $x + 4y + 34 = 0$.

(a) Find the gradient of L_1 .

(2)

The equation of line L_2 is $y = mx$. L_2 is perpendicular to L_1 .

(b) Find the value of m .

(2)

(c) Find the coordinates of the point of intersection of the lines L_1 and L_2 .

(2)

(Total 6 marks)

8. The mid-point, M, of the line joining A(s , 8) to B(-2 , t) has coordinates M(2, 3).

(a) Calculate the values of s and t .

(2)

(b) Find the equation of the straight line perpendicular to AB, passing through the point M.

(4)

(Total 6 marks)

9. Consider the line l : $2x + y + 4 = 0$.

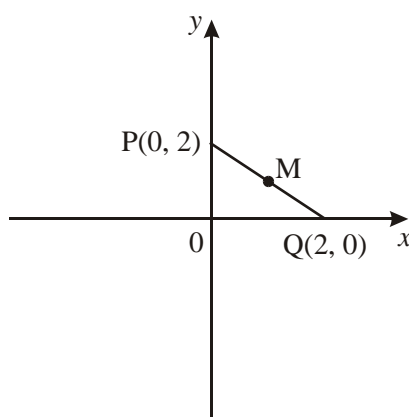
(a) Write down the gradient of l .

(b) Find the gradient of a line perpendicular to l .

(c) Find the equation of a line perpendicular to l , passing through the point (5, 3). Give your answer in the form $ax + by + d = 0$, where $a, b, d \in \mathbb{Z}$.

(Total 6 marks)

10. The following diagram shows the points P, Q and M. M is the midpoint of [PQ].



(a) Write down the equation of the line (PQ).

(b) Write down the equation of the line through M which is perpendicular to the line (PQ).

(Total 4 marks)

11. A line joins the points $A(2, 1)$ and $B(4, 5)$.

(a) Find the gradient of the line AB .

(2)

Let M be the midpoint of the line segment AB .

(b) Write down the coordinates of M .

(1)

(c) Find the equation of the line perpendicular to AB and passing through M .

(3)

(Total 6 marks)

12. $P(4, 1)$ and $Q(0, -5)$ are points on the coordinate plane.

(a) Determine the

(i) coordinates of M , the midpoint of P and Q ;

(ii) gradient of the line drawn through P and Q ;

(iii) gradient of the line drawn through M , perpendicular to PQ .

The perpendicular line drawn through M meets the y -axis at $R(0, k)$.

(b) Find k .

(Total 6 marks)

13. (a) Write down the gradient of the line $y = 3x + 4$.

(1)

(b) Find the gradient of the line that is perpendicular to the line $y = 3x + 4$.

(1)

(c) Find the equation of the line that is perpendicular to $y = 3x + 4$ and that passes through the point $(6, 7)$.

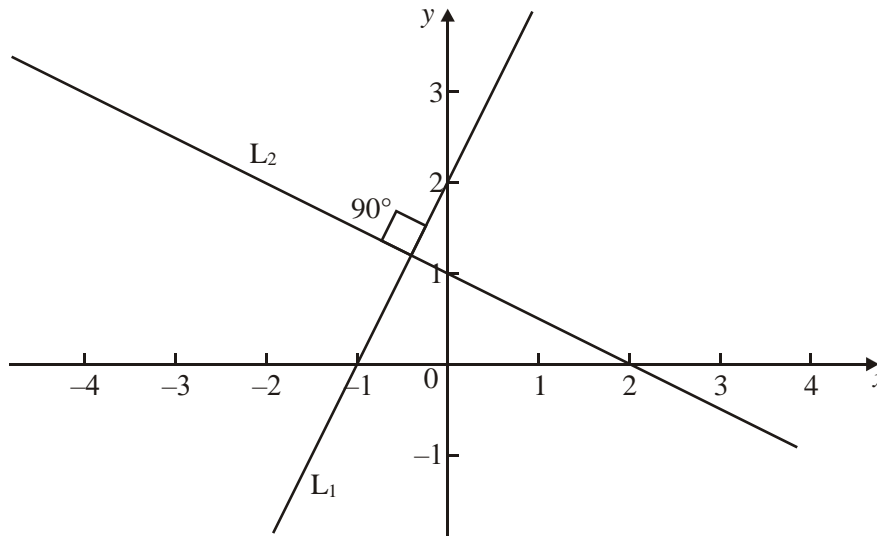
(2)

(d) Find the coordinates of the point of intersection of these two lines.

(2)

(Total 6 marks)

14. A student has drawn the two straight line graphs L_1 and L_2 and marked in the angle between them as a right angle, as shown below. The student has drawn one of the lines incorrectly.



Consider L_1 with equation $y = 2x + 2$ and L_2 with equation $y = -\frac{1}{4}x + 1$.

- Write down the gradients of L_1 and L_2 **using the given equations**.
- Which of the two lines has the student drawn incorrectly?
- How can you tell from the answer to part (a) that the angle between L_1 and L_2 should not be 90° ?
- Draw the correct version of the incorrectly drawn line on the diagram.

(Total 8 marks)

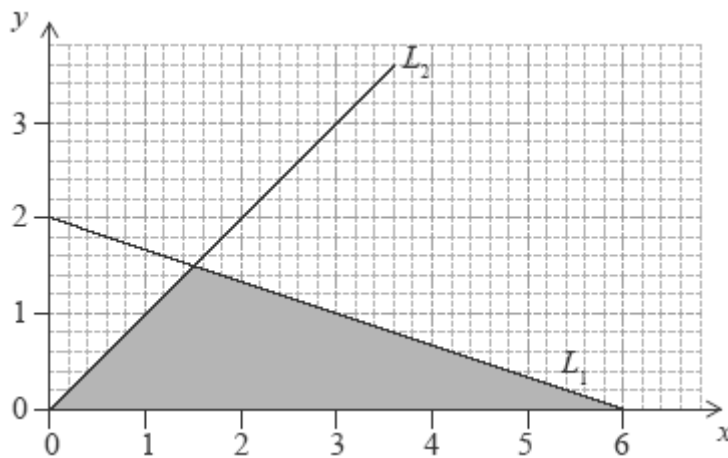
15. Three points are given $A(0, 4)$, $B(6, 0)$ and $C(8, 3)$.

- Calculate the gradient (slope) of line AB . (2)
- Find the coordinates of the midpoint, M , of the line AC . (2)
- Calculate the length of line AC . (2)
- Find the equation of the line BM giving your answer in the form $ax + by + d = 0$ where a , b and $d \in \mathbb{Z}$. (5)
- State whether the line AB is perpendicular to the line BC showing clearly your working and reasoning. (3)

(Total 14 marks)

16. The coordinates of the vertices of a triangle ABC are A (4, 3), B (7, -3) and C (0.5, p).
- (a) Calculate the gradient of the line AB. (2)
- (b) Given that the line AC is perpendicular to the line AB
- (i) write down the gradient of the line AC;
- (ii) find the value of p. (4)
- (Total 6 marks)**

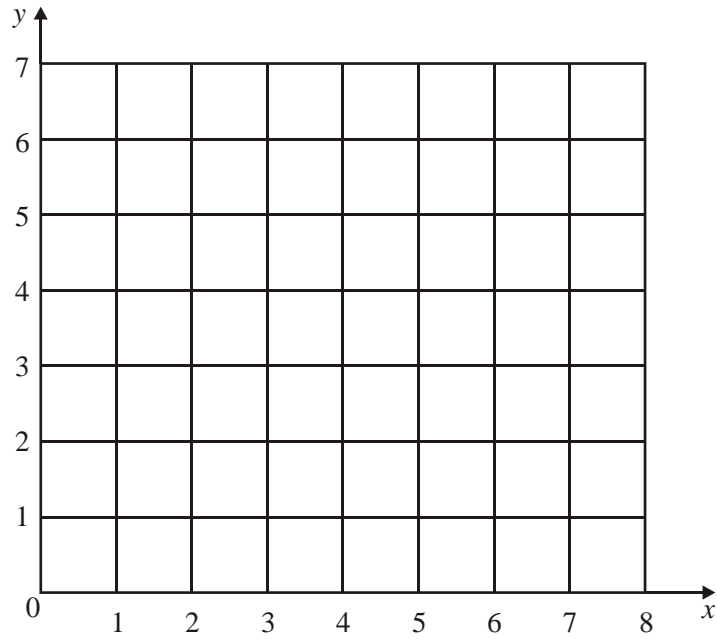
17. The diagram shows the straight lines L_1 and L_2 . The equation of L_2 is $y = x$.



- (a) Find
- (i) the gradient of L_1 ;
- (ii) the equation of L_1 . (3)
- (b) Find the area of the shaded triangle. (3)
- (Total 6 marks)**
18. The equation of the line R_1 is $2x + y - 8 = 0$. The line R_2 is perpendicular to R_1 .
- (a) Calculate the gradient of R_2 . (2)
- The point of intersection of R_1 and R_2 is (4, k).
- (b) Find
- (i) the value of k;
- (ii) the equation of R_2 . (4)
- (Total 6 marks)**

19. Two points are given as A (4, 3) and B(5, 7).

(a) Plot these points on the grid below.



(b) Join the points with a straight line.

(c) Calculate the gradient of the line AB.

(Total 8 marks)