

Level 3 Algebra - Coordinate Geometry

June 2013 - Question 8

Jan 2014 - Question 2

Jan 2015 - Question 3

June 2015 - Question 14

Jan 2016 - Question 5

June 2016 - Question 5

Jan 2017 - Question 5

June 2017 - Question 13

Jan 2018 - Question 9

June 2018 - Question 5

Jan 2019 - Question 6

Jan 2019 - Question 10

June 2019 - Question 10

June 2019 - Question 13

Jan 2020 - Question 8

Jan 2020 - Question 12

Jan 2021 - Question 15

Jan 2022 - Question 6

Jan 2022 - Question 13

June 2022 - Question 8

June 2022 - Question 18

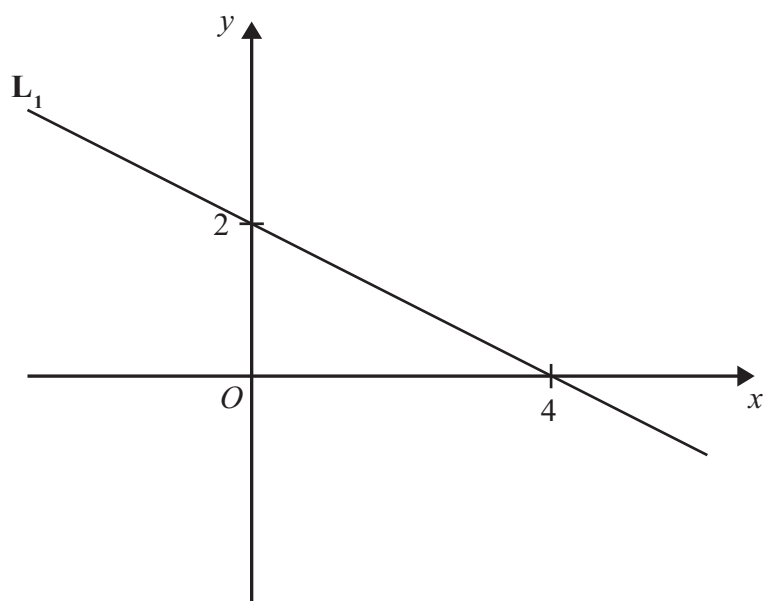
Jan 2023 - Question 5

June 2023 - Question 9

Jan 2024 - Question 7

Jan 2024 - Question 18

8 The diagram shows a straight line L_1



The line L_2 is perpendicular to L_1
 L_2 passes through the point $(3, 2)$.

Find an equation of the line L_2
Give your answer in the form $ax + by + c = 0$ where a , b and c are integers.

.....
(Total for Question 8 is 3 marks)



2 (a) Find the gradient of a straight line which is parallel to the line $2x - 6y = 5$

.....
(2)

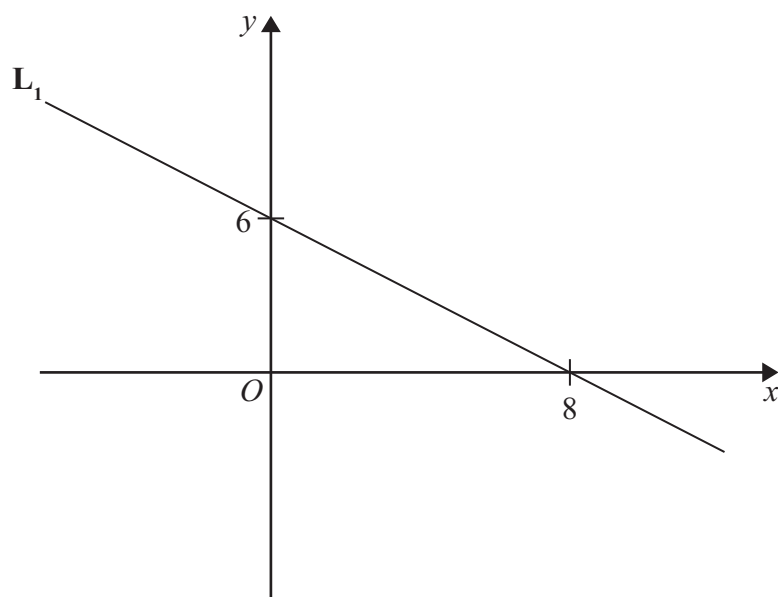
(b) Find an equation of a straight line which is perpendicular to the line $5x + y = 10$

.....
(2)

(Total for Question 2 is 4 marks)



3 The diagram shows a straight line L_1



The line L_2 is parallel to L_1 and passes through the point $(2, 1)$.

- (a) Find an equation of the line L_2
Give your answer in the form $y = mx + c$

.....
(3)



The line L_3 is perpendicular to L_1 and passes through the point $(0, -5)$.

(b) Find an equation of the line L_3

Give your answer in the form $ax + by + c = 0$ where a, b and c are integers.

.....
(3)

(Total for Question 3 is 6 marks)



13 Find the value of a such that the equation $ax^2 + 12x = -9$ has two equal roots.

.....
(Total for Question 13 is 2 marks)

14 The line L has equation $7y - 2x = 6$

(a) Find the gradient of any line that is parallel to L .

.....
(2)

(b) Find an equation of the line that is perpendicular to L and passes through the point $(4, -2)$.

Give your answer in the form $y = mx + c$.

.....
(3)

(Total for Question 14 is 5 marks)



5 The straight line L_1 has equation $y = \frac{1}{2}x + 5$

(a) Write the equation of L_1 in the form $ax + by + c = 0$ where a , b and c are integers.

.....
(2)

The straight line L_2 has equation $y = \frac{1}{3}x - 2$

The point A has coordinates $(6, 6)$

(b) (i) Find an equation of the straight line parallel to L_2 which passes through A .

Give your answer in the form $y = mx + c$

.....
(ii) Find an equation of the straight line perpendicular to L_2 which passes through A .

.....
(4)

(Total for Question 5 is 6 marks)



5 The straight line **L** passes through the points *A* and *B* with coordinates (1, 3) and (−1, −1) respectively.

(a) Find an equation for **L** in the form $ax + by + c = 0$ where *a*, *b* and *c* are integers.

.....
(3)

(b) Find an equation of a straight line which is perpendicular to the line $4y = x + 8$

.....
(2)

(Total for Question 5 is 5 marks)



5 The straight line L_1 has equation $5x + 3y = 15$

(a) Write the equation of L_1 in the form $y = mx + c$

.....
(1)

The straight line L_2 passes through the origin and is perpendicular to L_1

(b) Find an equation of the straight line L_2

.....
(2)

The straight line L_3 is parallel to L_1 and passes through the point with coordinates $(6, 0)$.

(c) Find an equation of the straight line L_3

.....
(2)

(Total for Question 5 is 5 marks)



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13 The line **T** has equation $y - 4x = 6$

(a) Write down the gradient of a line that is perpendicular to **T**.

.....
(2)

(b) Find an equation of the line that is parallel to **T** and passes through the point $(\frac{1}{3}, 5)$

Give your answer in the form $ax + by + c = 0$ where a, b and c are integers.

.....
(3)

(Total for Question 13 is 5 marks)



9 The straight line L_1 passes through the points P and Q with coordinates $(2, 5)$ and $(6, -2)$ respectively.

(a) Find an equation for L_1 in the form $ax + by = c$ where a, b and c are integers.

.....
(3)

The straight line L_2 is perpendicular to L_1 and passes through the point $(7, 5)$.

(b) Find an equation for L_2 in the form $y = mx + c$

.....
(3)

The straight lines L_3 and L_4 have equations $y = 3x$ and $x = 3y$ respectively.

(c) Are the lines L_3 and L_4 perpendicular to each other?
Give a reason for your answer.

(1)

(Total for Question 9 is 7 marks)



5 The straight line **L** has equation $3y + 4x - 5 = 0$

(a) Find the gradient of any straight line that is parallel to **L**.

.....
(2)

(b) Find an equation of the straight line that is perpendicular to **L** and passes through the point (12, 2)

Give your answer in the form $ax + by + c = 0$ where a , b and c are integers.

.....
(3)

(Total for Question 5 is 5 marks)



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6 The straight line **L** is the tangent to a curve at the point *P*.

The equation of **L** is $x + 2y = 5$

(a) Find the gradient of this tangent.

.....
(2)

(b) Find the gradient of the normal to the curve at *P*.

.....
(1)

(Total for Question 6 is 3 marks)



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10 The straight line L_1 has gradient $\frac{4}{5}$ and passes through the point with coordinates $(2, -1)$

(a) Find an equation for L_1 in the form $px + qy + r = 0$ where p, q and r are integers.

.....
(3)

The straight line L_2 is parallel to L_1 and passes through the point with coordinates $(3, 4)$

(b) Find an equation for L_2 in the form $y = mx + c$

.....
(3)

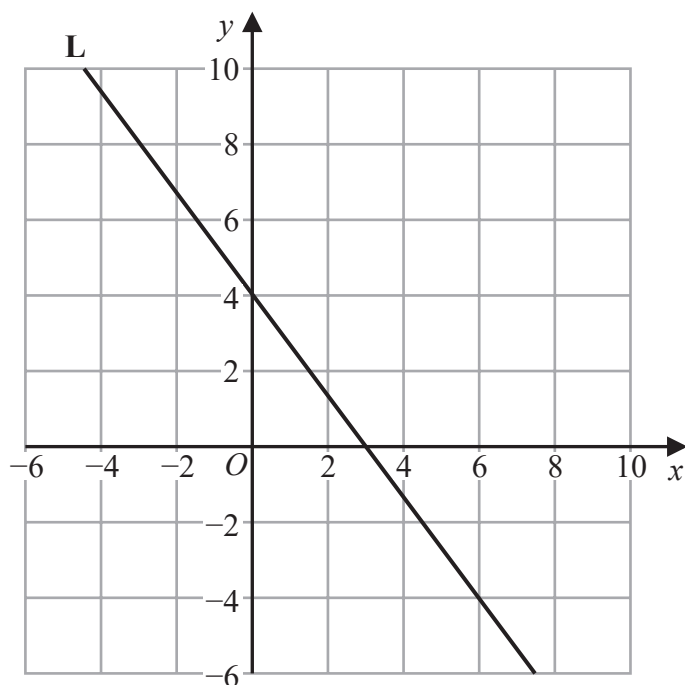
(c) Show, by considering gradients, that the line with equation $3x + 2y = 4$ is perpendicular to the line with equation $2x - 3y = 6$

(2)

(Total for Question 10 is 8 marks)



10 The straight line L is drawn on the grid.



(a) Find an equation for L

Give your answer in the form $ax + by + c = 0$ where a , b and c are integers.

.....
(3)

The straight line L_1 is parallel to L

(b) Find the gradient of L_1

.....
(1)

(Total for Question 10 is 4 marks)



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13 The straight line **M** has equation $y = -\frac{2}{5}x + 3$

The point *A* has coordinates (3, 4)

- (a) Find an equation of the straight line which passes through *A* and is parallel to **M**.
Give your answer in the form $y = mx + c$

.....
(3)

- (b) Find an equation of the straight line which passes through *A* and is perpendicular to **M**.

.....
(2)

(Total for Question 13 is 5 marks)



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

(a) Write the equation of L_1 in the form $ax + by = c$ where a , b and c are integers.

.....
(1)

The straight line L_2 is parallel to L_1 and passes through the point with coordinates $(-2, -6)$

(b) Find an equation for L_2 in the form $y = mx + c$

.....
(3)

(Total for Question 8 is 4 marks)

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12 The equation of the straight line **L** is $4x + 3y + 2 = 0$

(a) Find the gradient of **L**

.....
(2)

The straight line **L** is the normal to a curve at the point $A(1, -2)$

(b) Find an equation of the tangent to this curve at A .

Give your answer in the form $px + qy + r = 0$ where p , q and r are integers.

.....
(3)

(Total for Question 12 is 5 marks)



15 The point A has coordinates $(2, 7)$ and the point B has coordinates $(-2, -5)$

The straight line L passes through point A and point B .

The point D has coordinates $(3, 5)$

- (a) Find an equation of the straight line which passes through D and is parallel to L
Give your answer in the form $y = mx + c$

.....
(3)

The line M is perpendicular to the line L

- (b) Write down the gradient of M

.....
(1)

(Total for Question 15 is 4 marks)



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6 A straight line passes through the points with coordinates (3, 1) and (-2, 5)

(a) Find the gradient of this line.

.....
(2)

(b) Find an equation for this line.
Give your answer in the form $y = mx + c$

.....
(3)

(Total for Question 6 is 5 marks)



13 The straight line L has equation $y = 4x + 1$

L is the tangent to a curve at the point P with coordinates $(1, 5)$

Find an equation of the normal to this curve at P .

Give your answer in the form $ax + by + c = 0$ where a , b and c are integers.

.....
(Total for Question 13 is 4 marks)

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- 7 (a) Find an equation of the straight line which passes through the origin and is parallel to the straight line with equation $3x = 4y + 7$

.....
(1)

- (b) Find the gradient of a line perpendicular to the line with equation $2x = 5y + 8$

.....
(2)

(Total for Question 7 is 3 marks)

- 8 Here is a quadratic equation.

$$9x^2 - 12x + 4 = 0$$

Use the discriminant to determine whether the equation has

- 2 real and different roots
- or** 2 real and equal roots
- or** no real roots.

.....
(Total for Question 8 is 2 marks)



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18 The straight line **L** passes through the points *A* and *B*.

The coordinates of *A* are (3, -8)

The coordinates of *B* are (-1, 7)

Find an equation for **L**

Give your answer in the form $ax + by + c = 0$ where *a*, *b* and *c* are integers.

.....
(Total for Question 18 is 3 marks)



5 The straight line **L** has gradient $\frac{2}{3}$

The line passes through the point with coordinates (0, 4)

(a) Find an equation for **L**

Give your answer in the form $ax + by + c = 0$ where a , b and c are integers.

.....
(3)

The point A has coordinates $(-2, -5)$

(b) Find an equation of the straight line which passes through A and is perpendicular to **L**

Give your answer in the form $y = mx + c$

.....
(3)

(Total for Question 5 is 6 marks)



9 The straight line L_1 passes through the points with coordinates $(-1, 3)$ and $(5, 6)$

(a) Find an equation for L_1 in the form $y = mx + c$

.....
(3)

The straight line L_2 is perpendicular to L_1 and passes through the point with coordinates $(4, -2)$

(b) Find an equation for L_2 in the form $ax + by = c$ where a , b and c are integers.

.....
(3)

(Total for Question 9 is 6 marks)



7 (a) Find the gradient of a line parallel to the line $4y = 3x$

.....
(1)

(b) Find an equation of the straight line which passes through the origin and is perpendicular to the straight line with equation $2x = 5y + 3$

.....
(2)

(Total for Question 7 is 3 marks)

8 Here is a quadratic equation.

$$2x^2 - 5x + 4 = 0$$

Use the discriminant to determine whether the equation has

2 real and different roots
or 2 real and equal roots
or no real roots.

.....
(Total for Question 8 is 2 marks)



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18 The straight line **L** passes through the points *P* and *Q*.

P is the point $(-3, 11)$

Q is the point $(2, -4)$

Find an equation for **L**

Give your answer in the form $y = mx + c$ where m and c are integers.

.....
(Total for Question 18 is 3 marks)

