



5.15H Equation of a Line: Higher Tier Practice

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 75 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Work out the gradient of the line joining the points (2, 3) and (5, 11).

(Total for Question 1 is 1 mark)

- 2** Find the equation of the line with gradient -2 that passes through the point (4, -1). Give your answer in the form $y = mx + c$.

(Total for Question 2 is 3 marks)

- 3** Give the equation of the line in standard form $ax + by + c = 0$ that passes through the points (0, 5) and (3, -1).

(Total for Question 3 is 3 marks)

4 The line L has equation $3x - 2y + 6 = 0$.

(a) Work out the gradient of L.

(b) Find the equation of the line through (2, 1) parallel to L. Give your answer in the form $y = mx + c$.

(c) Find the equation of the line through (2, 1) perpendicular to L. Give your answer in the form $y = mx + c$.

(a) Work out the gradient of L. **(1)**

(b) Find the equation of the line through (2, 1) parallel to L. Give your answer in the form $y = mx + c$. **(2)**

(c) Find the equation of the line through (2, 1) perpendicular to L. Give your answer in the form $y = mx + c$. **(1)**

(Total for Question 4 is 4 marks)

5 Work out the intersection point of the lines $y = 2x + 1$ and $y = -x + 7$. Give full working and the final coordinates.

(Total for Question 5 is 5 marks)

6 Show that the points A(1, 2), B(3, -2) and C(5, -6) are collinear. State the equation of the line containing them.

(Total for Question 6 is 4 marks)

- 7** Find the equation of the perpendicular bisector of the line segment joining (1, 1) and (5, 3).
Give your answer in the form $y = mx + c$.

(Total for Question 7 is 5 marks)

- 8** Find the value of k for which the line $y = kx + 3$ is perpendicular to the line $2x + y - 5 = 0$.
Show your working.

(Total for Question 8 is 3 marks)

Mark scheme · 5.15H Equation of a Line: Higher Tier Practice

Question 1

- **B1** $\frac{8}{3}$ cao
- **Answer:** $\frac{8}{3}$

Question 2

- **M1** substitute point into $y = -2x + c$ to form an equation for c
- **A1** $c = 7$ cao
- **A1** $y = -2x + 7$ cao
- **Answer:** $y = -2x + 7$

Question 3

- **M1** find gradient $m = \frac{(-1 - 5)}{(3 - 0)} = \frac{-6}{3} = -2$
- **M1** use $y = mx + c$ or point-substitution to find $c = 5$
- **A1** $2x + y - 5 = 0$ cao
- **Answer:** $2x + y - 5 = 0$

Question 4

- (a) **B1** $\frac{3}{2}$ cao
- (a) **Answer:** $\frac{3}{2}$
- (b) **M1** use gradient $\frac{3}{2}$ and substitute $(2,1)$ into $y = \frac{3}{2}x + c$ to find c
- (b) **A1** $y = \frac{3}{2}x - 2$ cao
- (b) **Answer:** $y = \frac{3}{2}x - 2$
- (c) **A1** $y = -\frac{2}{3}x + \frac{7}{3}$ cao
- (c) **Answer:** $y = -\frac{2}{3}x + \frac{7}{3}$

Question 5

- **M1** equate $2x + 1 = -x + 7$ to form an equation in x
- **M1** collect terms and solve for x giving $x = 2$
- **A1** $x = 2$ cao
- **M1** substitute $x = 2$ into one of the equations to find y
- **A1** $y = 5$ cao
- **Answer:** $(2, 5)$

Question 6

- **M1** find gradient $AB = \frac{(-2 - 2)}{(3 - 1)} = \frac{-4}{2} = -2$
- **M1** find gradient $BC = \frac{(-6 - (-2))}{(5 - 3)} = \frac{-4}{2} = -2$
- **A1** state gradients equal, so collinear cao
- **B1** give equation $y = -2x + 4$ cao
- **Answer:** They are collinear; equation $y = -2x + 4$

Question 7

- **M1** find midpoint $\left(\frac{1+5}{2}, \frac{1+3}{2}\right) = (3, 2)$
- **M1** find gradient of segment $= \frac{(3 - 1)}{(5 - 1)} = \frac{2}{4} = \frac{1}{2}$
- **M1** perpendicular gradient $= -2$
- **M1** form equation $y - 2 = -2(x - 3)$
- **A1** $y = -2x + 8$ cao
- **Answer:** $y = -2x + 8$

Question 8

- **M1** rearrange $2x + y - 5 = 0$ to $y = -2x + 5$
- **M1** use product of gradients $k * -2 = -1$ for perpendicular lines
- **A1** $k = 1/2$ cao
- **Answer: 1/2**