HIGHER

6.6 Parallel and Perpendicular Lines: 30-minute Pack

Total Marks

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A straight line has equation $y = 4x - 7$

(a) Write down the gradient of the line. **(1)**

.....

(b) Write down the coordinates of the point where the line crosses the y-axis. **(1)**

.....

(c) Show that the point (3, 5) lies on the line. **(2)**

(Total for Question 1 is 4 marks)

---

2 For each pair of lines below, state whether the lines are parallel, perpendicular or neither, giving a reason based on their gradients.

(a) Line P has gradient 5. Line Q has gradient 5. **(1)**

(b) Line R has gradient 2. Line S has gradient -1/2. **(1)**

(c) Line T has gradient 3. Line U has gradient 1/3. **(1)**

(Total for Question 2 is 3 marks)

© Revision Library | revisionlibrary.co.uk

3 Find the equation of the line that is parallel to $y = 2x - 1$ and passes through the point (3, 10). Give your answer in the form $y = mx + c$.

(Total for Question 3 is 3 marks)

---

4 A straight line has equation $y = -(2/5)x + 3$

(a) State the gradient of a line that is perpendicular to this line. **(1)**

(b) Find the equation of the line perpendicular to $y = -(2/5)x + 3$ that passes through the point (-4, 1). Give your answer in the form $y = mx + c$ **(3)**

(Total for Question 4 is 4 marks)

© Revision Library | revisionlibrary.co.uk

5 Three straight lines are given below.

L1: $y = 4x + 1$

L2: $8x - 2y = 5$

L3: $x + 4y = 8$

(a) Show that L1 and L2 are parallel. **(2)**

(b) Show that L1 and L3 are perpendicular. **(2)**

(c) State the relationship between L2 and L3, giving a reason for your answer. **(2)**

(Total for Question 5 is 6 marks)

---

6 P and Q are the points (1, 2) and (7, 6).

(a) Find the midpoint of PQ. **(2)**

.....

(b) Find the gradient of PQ. **(2)**

.....

(c) Find the equation of the perpendicular bisector of PQ. Give your answer in the form $ax + by = c$, where a, b and c are integers. **(3)**

.....

(Total for Question 6 is 7 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 6.6 Parallel and Perpendicular Lines: 30-minute Pack

Question 1

(a) 4 (cao) **B1**

(a) Answer: 4

(b) (0, -7) (cao) **B1**

(b) Answer: (0, -7)

(c) substitutes x = 3 into y = 4x - 7 **M1**

(c) correctly shows y = 5, matching the given point (cso) **A1**

(c) Answer: (3, 5) lies on the line since y = 4(3) - 7 = 5

Question 2

(a) parallel, since the gradients are equal (cao) **B1**

(a) Answer: Parallel (equal gradients)

(b) perpendicular, since 2 x (-1/2) = -1 (cao) **B1**

(b) Answer: Perpendicular (gradients multiply to -1)

(c) neither, since the gradients are not equal and 3 x (1/3) = 1, not -1 (cao) **B1**

(c) Answer: Neither (gradients not equal, and product is 1, not -1)

Question 3

gradient = 2 identified **M1**

10 = 2(3) + c oe substituted **M1**

y = 2x + 4 cao **A1**

Answer: y = 2x + 4

Question 4

(a) 5/2 (oe 2.5) (cao) **B1**

(a) Answer: 5/2

(b) uses the correct perpendicular gradient of 5/2, ft their part (a) **M1**

(b) correct method, e.g. y - 1 = (5/2)(x - (-4)) **M1**

(b) y = (5/2)x + 11 (oe, e.g. y = 2.5x + 11) (cao) **A1**

(b) Answer: y = (5/2)x + 11

Question 5

(a) rearranges L2 into the form y = mx + c, y = 4x - 2.5 (oe) **M1**

(a) correct conclusion: both lines have gradient 4 and different y-intercepts, so L1 and L2 are parallel (cso) **C1**

(a) Answer: L1 and L2 are parallel (both have gradient 4)

(b) rearranges L3 into the form y = mx + c, y = -0.25x + 2 (oe), and multiplies gradients **M1**

(b) correct conclusion: 4 x (-1/4) = -1, so L1 and L3 are perpendicular (cso) **C1**

(b) Answer: L1 and L3 are perpendicular (gradients multiply to -1)

(c) identifies gradient of L2 as 4 and gradient of L3 as -1/4, ft their parts (a) and (b) **M1**

(c) perpendicular, since 4 x (-1/4) = -1 (cao) **A1**

(c) Answer: L2 and L3 are perpendicular

Question 6

(a) correct method, e.g. ((1 + 7)/2, (2 + 6)/2) **M1**

(a) (4, 4) (cao) **A1**

(a) Answer: (4, 4)

(b) correct substitution, e.g. (6 - 2)/(7 - 1) **M1**

(b) 2/3 (oe) (cao) **A1**

(b) Answer: 2/3

(c) finds the perpendicular gradient -3/2, ft their part (b) **M1**

(c) correct method using the midpoint from part (a), e.g. y - 4 = -(3/2)(x - 4) **M1**

(c) 3x + 2y = 20 (oe, integer coefficients) (cao) **A1**

(c) Answer: 3x + 2y = 20

© Revision Library | revisionlibrary.co.uk