5.15 Equation of a Line: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Given y = 3x - 6, work out the x-intercept and the y-intercept of this line.

(Total for Question 1 is 2 marks)

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2 Find the gradient of the line joining the points A(2, 5) and B(6, 13).

(Total for Question 2 is 2 marks)

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3 The line l has equation y = -1/2 x + 4.
Find the equation of the line m that is parallel to l and passes through the point (4, 1). Give your answer in the form y = mx + c.

(Total for Question 3 is 2 marks)

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

(Total for Question 4 is 1 mark)

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5 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 5 is 3 marks)

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6 Find the equation of the straight line that is parallel to y = 4x - 3 and passes through the point (2, 1). Give your answer in the form y = mx + c.

(Total for Question 6 is 3 marks)

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7 A straight line has gradient -1 and passes through the point (1, -8). Find an equation of the line.

(Total for Question 7 is 3 marks)

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8 The line y = 4x + k passes through the point (3, 20). Find the value of k, and the coordinates of the point where the line crosses the x-axis.

(Total for Question 8 is 3 marks)

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9 A straight line passes through the points A(0, 1) and B(2, 9). Find an equation of the line.

(Total for Question 9 is 3 marks)

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10 A straight line has gradient -1/2 and passes through the point (4, 2). Find an equation of the line.

(Total for Question 10 is 3 marks)

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11 A straight line crosses the x-axis at (6, 0) and the y-axis at (0, -4). Find an equation of the line.

(Total for Question 11 is 3 marks)

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12 A taxi charges £2 plus £8 per mile. Write a formula for the total cost, C pounds, after m miles.

(Total for Question 12 is 2 marks)

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13 Determine whether the point (5, 12) lies on the line with equation $y = 2x + 3$. You must show your working.

(Total for Question 13 is 3 marks)

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14 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 14 is 4 marks)

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15 Show that the points A(1, 1), B(3, 5) and C(6, 11) are collinear.

(Total for Question 15 is 4 marks)

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16 R is the point (-4, 1) and S is the point (2, 9). Find the equation of the perpendicular bisector of RS. Give your answer in the form $y = mx + c$.

(Total for Question 16 is 5 marks)

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Mark scheme · 5.15 Equation of a Line: 1-hour Pack

Question 1

find x-intercept by setting y = 0 to get x = 2, or find y-intercept as c = -6	M1
x-intercept (2, 0) and y-intercept (0, -6) cao	A1

Answer: x-intercept (2, 0); y-intercept (0, -6)

Question 2

correct substitution into (y2 - y1)/(x2 - x1), e.g. (13-5)/(6-2)	M1
2 cao	A1

Answer: 2

Question 3

use same gradient -1/2 and substitute point to find c	M1
y = -1/2 x + 3 cao	A1

Answer: y = -1/2 x + 3

Question 4

8/3 cao	B1

Answer: 8/3

Question 5

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

Answer: y = -2x + 7

Question 6

gradient = 4, since parallel lines have equal gradients	B1
substitutes (2, 1) and m = 4 into y = mx + c (dep)	M1
y = 4x - 7 oe cao	A1

Answer: y = 4x - 7

Question 7

y = -x + c with substitution of (1, -8)	M1
c = -7 found	M1
y = -x - 7 oe	A1

Answer: y = -x - 7

Question 8

20 = 4 x 3 + k	M1
k = 8	A1
(-2, 0) oe	A1

Answer: k = 8, (-2, 0)

Question 9

gradient = (9 - 1) / (2 - 0) oe	M1
substitutes a point to find c	M1
y = 4x + 1 oe	A1

Answer: y = 4x + 1

Question 10

y = -1/2x + c with substitution of (4, 2)	M1
c = 4 found	M1
y = -x/2 + 4 oe	A1

Answer: y = -x/2 + 4

Question 11

gradient = 2/3 oe or c = -4	M1
y = mx - 4 with correct m	M1
y = 2x/3 - 4 oe	A1

Answer: y = 2x/3 - 4

Question 12

8m or 2 identified	M1
C = 8m + 2 oe	A1

Answer: C = 8m + 2

Question 13

substitutes x = 5 into y = 2x + 3	M1
y = 13 found	A1
(dep) correct conclusion: since 13 is not equal to 12, the point (5, 12) does not lie on the line	B1

Answer: The point (5, 12) does not lie on the line, since y = 2(5) + 3 = 13, not 12.

Question 14

find gradient AB = (-2 - 2)/(3 - 1) = -4/2 = -2	M1
find gradient BC = (-6 - (-2))/(5 - 3) = -4/2 = -2	M1
state gradients equal, so collinear cao	A1
give equation y = -2x + 4 cao	B1

Answer: They are collinear; equation y = -2x + 4

Question 15

finds the gradient of AB	M1
gradient of AB = 2	A1
finds the gradient of BC	M1
(dep on all previous marks) gradient of BC = 2; since gradient AB = gradient BC = 2 and B is a common point to both segments, A, B and C are collinear	A1

Answer: Gradient AB = gradient BC = 2, and B is common to both, so A, B and C are collinear.

Question 16

finds the midpoint of RS, (-1, 5)	M1
finds the gradient of RS, 4/3	M1
finds the perpendicular gradient, -3/4	M1
substitutes the midpoint into y = -3/4 x + c (or uses y - 5 = -3/4(x + 1))	M1
y = -3/4 x + 17/4 oe cao	A1

Answer: y = -3/4 x + 17/4 (or y = -0.75x + 4.25)

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