5.15 Equation of a Line: Test Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Work out y when x = 4 for the equation y = 2x + 3.

(Total for Question 1 is 1 mark)

2 Solve 2x + 3 = -x + 9.

(Total for Question 2 is 2 marks)

3 A taxi company charges a fixed flag drop of £2.50 plus £0.80 for each kilometre. The fare is given by F = 2.50 + 0.80d, where d is the distance in kilometres and F is the fare in pounds.

(a) Calculate the fare for a 10 km journey. **(1)**

.....

(b) Find the distance d when the fare is £10.00. Give your answer to 1 decimal place if needed. **(2)**

.....

(Total for Question 3 is 3 marks)

© Revision Library | revisionlibrary.co.uk

4 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 4 is 3 marks)

---

5 Write $-2x + 5y = 0$ in the form $y = mx + c$.

(Total for Question 5 is 2 marks)

---

6 A straight line has gradient 1 and passes through the point (-2, 3). Find an equation of the line.

(Total for Question 6 is 3 marks)

---

7 P has coordinates (-2, 3) and Q has coordinates (6, -9). Find the coordinates of the midpoint of PQ.

(Total for Question 7 is 2 marks)

---

8 A straight line has equation $3x + 2y = 16$. Write the equation in the form $y = mx + c$, and state the gradient and the y-intercept of the line.

(Total for Question 8 is 3 marks)

© Revision Library | revisionlibrary.co.uk

9 A candle is lit and burns down at a constant rate. The height, h cm, of the candle t minutes after being lit is modelled by $h = 20 - 0.4t$.

(a) State what the value 20 represents in this context. **(1)**

(b) State what the gradient of the line represents in this context. **(1)**

(c) Find the height of the candle 25 minutes after it is lit. **(2)**

.....

(Total for Question 9 is 4 marks)

---

10 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 10 is 5 marks)

---

11 Line L1 has equation $4x + 2y = 10$. Line L2 passes through the points (0, 3) and (2, 7). Determine, showing your working, whether L1 and L2 are perpendicular.

(Total for Question 11 is 4 marks)

© Revision Library | revisionlibrary.co.uk

12 A is the point (1, 2) and B is the point (6, 9). Calculate the length of AB, giving your answer correct to 3 significant figures.

(Total for Question 12 is 3 marks)

---

13 Line L1 has equation $y = 5x - 2$. Line L2 has equation $10x - 2y + 4 = 0$. Show that L1 and L2 are parallel but are not the same line.

(Total for Question 13 is 3 marks)

---

14 A quadrilateral has vertices A(0, 1), B(4, 3), C(6, -1) and D(2, -3).

(a) Show that AB is parallel to DC. **(3)**

(b) Show that AD is perpendicular to AB. **(3)**

(Total for Question 14 is 6 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 5.15 Equation of a Line: Test Pack

Question 1

y = 11 cao **B1**

Answer: 11

Question 2

collect terms to get 3x = 6 or equivalent method **M1**

x = 2 cao **A1**

Answer: 2

Question 3

(a) F = 10.50 cao **B1**

(a) Answer: 10.50

(b) set up 10.00 = 2.50 + 0.80d and isolate d **M1**

(b) d = 9.375 so d = 9.4 km awrt **A1**

(b) Answer: 9.4 km

Question 4

find gradient m = (-1 - 5)/(3 - 0) = -6/3 = -2 **M1**

use y = mx + c or point-substitution to find c = 5 **M1**

2x + y - 5 = 0 cao **A1**

Answer: 2x + y - 5 = 0

Question 5

divides every term by 5 or isolates 5y **M1**

y = 2x/5 oe **A1**

Answer: y = 2x/5

Question 6

y = x + c with substitution of (-2, 3) **M1**

c = 5 found **M1**

y = x + 5 oe **A1**

Answer: y = x + 5

Question 7

correct use of the midpoint formula ((x1+x2)/2, (y1+y2)/2) **M1**

(2, -3) cao **A1**

Answer: (2, -3)

Question 8

rearranges to make y the subject, e.g. 2y = -3x + 16 **M1**

y = -3/2 x + 8 oe cao **A1**

gradient = -3/2 (or -1.5) and y-intercept = (0, 8) stated, ft their equation **B1**

Answer: y = -1.5x + 8; gradient = -1.5; y-intercept = (0, 8)

Question 9

(a) the height of the candle when it is lit (at t = 0) oe **B1**

(a) Answer: The starting height of the candle, 20 cm, at the moment it is lit.

(b) the rate at which the candle burns down, 0.4 cm per minute oe **B1**

(b) Answer: The candle burns down at 0.4 cm per minute.

(c) substitutes t = 25 into h = 20 - 0.4t **M1**

(c) 10 cm cao **A1**

(c) Answer: 10 cm

Question 10

equate 2x + 1 = -x + 7 to form an equation in x **M1**

collect terms and solve for x giving x = 2 **M1**

x = 2 cao **A1**

substitute x = 2 into one of the equations to find y **M1**

y = 5 cao **A1**

Answer: (2, 5)

Question 11

rearranges L1 to y = -2x + 5 oe to find gradient -2 **M1**

finds gradient of L2 = (7 - 3)/(2 - 0) = 2 **M1**

product of gradients = -2 x 2 = -4 **A1**

cao: concludes L1 and L2 are not perpendicular, since the product is not -1 **A1**

Answer: Not perpendicular (product of gradients = -4)

Question 12

correct substitution into the distance formula, $\sqrt{(6-1)^2 + (9-2)^2}$ **M1**

$\sqrt{74}$ oe seen **A1**

awrt 8.60 **A1**

Answer: 8.60

Question 13

rearranges L2 into the form y = mx + c **M1**

y = 5x + 2 **A1**

(dep on both marks) correct conclusion: both lines have gradient 5, so they are parallel; the y-intercepts are different (-2 and 2), so they are not the same line **B1**

Answer: L2 rearranges to y = 5x + 2. Both lines have gradient 5, so they are parallel, but the y-intercepts (-2 and 2) differ, so they are not the same line.

Question 14

(a) finds gradient of AB **M1**

(a) finds gradient of DC **M1**

(a) both gradients equal 1/2, so AB is parallel to DC **A1**

(a) Answer: Gradient AB = gradient DC = 1/2, so AB is parallel to DC.

(b) finds gradient of AD **M1**

(b) multiplies gradient of AD by gradient of AB (ft their part a gradient) **M1**

(b) product = -1, so AD is perpendicular to AB **A1**

(b) Answer: Gradient AD = -2. -2 x 1/2 = -1, so AD is perpendicular to AB.

© Revision Library | revisionlibrary.co.uk