



KS3.M-A16 Straight Line Graphs: $y = mx + c$

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Plot the point (2, 3) on a coordinate grid. State the coordinates you plotted.

(1)

- 2** A line has equation $y = 2x + 1$. State the gradient and the y-intercept.

(1)

- 3** For the line $y = -3x + 4$, calculate y when $x = 0$ and when $x = 2$. Give both values.

(1)

- 4** Draw the line $y = x - 2$ on a grid. Give the coordinates of two points on the line that you would plot.

(1)

- 5** The line $y = 0.5x + 3$ is drawn. What is the y-intercept? Give your answer as a coordinate point.

(1)

- 6** A line passes through the points (1, 2) and (3, 6). Calculate the gradient of this line.

(2)

- 7** Find the equation of the line with gradient 3 and y-intercept -1. Write your answer in the form $y = mx + c$.

(2)

- 8** A line has equation $y = -2x + 5$. A second line has equation $y = -2x - 1$. Explain whether the lines are parallel or not and why.

(2)

- 9** The line $y = mx + 2$ passes through the point (4, 10). Find the value of m .

(2)

- 10** A line through (0, -3) and (2, 1) is drawn. Find its equation in the form $y = mx + c$.

(2)

- 11** The graph of a line is shown passing through (1, 4) and (4, 1). Find the equation of the line in the form $y = mx + c$.

(3)

- 12** A straight line passes through points A(-2, 0) and B(2, 4). Work out the equation of the line in the form $y = mx + c$.

(3)

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- 13** Given the line $y = 4x - 6$, a student plots the point (2, 3) and says it lies on the line. Is the student correct? Show your working.

(3)

Mark scheme · KS3.M-A16 Straight Line Graphs: $y = mx + c$

Question 1

- **B1** Point correctly plotted at (2, 3) or coordinates stated as (2, 3) cao
- Answer: **(2, 3)**

Question 2

- **B1** Gradient = 2 and y-intercept = 1 (or stated as (0, 1)) cao
- Answer: **gradient 2, y-intercept 1**

Question 3

- **B1** $y = 4$ when $x = 0$ and $y = -2$ when $x = 2$ cao
- Answer: **$y = 4$; $y = -2$**

Question 4

- **B1** Two correct points on the line, e.g. (0, -2) and (2, 0) or equivalent cao
- Answer: **(0, -2) and (2, 0)**

Question 5

- **B1** y-intercept (0, 3) cao
- Answer: **(0, 3)**

Question 6

- **M1** Use gradient formula (change in y)/(change in x) = $(6 - 2)/(3 - 1)$ or equivalent
- **A1** Gradient = 2 cao
- Answer: **2**

Question 7

- **M1** Substitute gradient and intercept into $y = mx + c$ form
- **A1** $y = 3x - 1$ cao
- Answer: **$y = 3x - 1$**

Question 8

- **M1** States that gradients are equal (both -2) or states property of parallel lines
- **A1** Concludes the lines are parallel because they have the same gradient (different intercepts) cao
- Answer: **They are parallel because both have gradient -2 (different y-intercepts).**

Question 9

- **M1** Substitute $x=4$, $y=10$ into $y = mx + 2$ leading to $10 = 4m + 2$ or equivalent
- **A1** $m = 2$ cao
- Answer: **2**

Question 10

- **M1** Find gradient: $(1 - (-3))/(2 - 0) = 4/2 = 2$ or equivalent
- **A1** $y = 2x - 3$ cao
- Answer: **$y = 2x - 3$**

Question 11

- **M1** Calculate gradient using $(1 - 4)/(4 - 1)$ or (change in y)/(change in x)
- **M1** Obtain gradient $m = -1$
- **A1** Substitute to find c and give equation $y = -x + 5$ cao
- Answer: **$y = -x + 5$**

Question 12

- **M1** Use gradient formula: $(4 - 0)/(2 - (-2))$ or equivalent
- **M1** Find gradient $m = 1$
- **A1** Substitute to find $c = 2$ and give equation $y = x + 2$ cao
- **Answer:** $y = x + 2$

Question 13

- **M1** Substitute $x = 2$ into $y = 4x - 6$ to find expected y -value or state the check equation $y = 4(2) - 6$
- **M1** Obtain $y = 8 - 6 = 2$ or show arithmetic leading to 2
- **A1** State that $(2, 3)$ is not on the line because y would be 2, not 3 cao
- **Answer:** **No. Substituting $x = 2$ gives $y = 4(2) - 6 = 2$, so the point $(2, 3)$ is not on the line.**