

# Y8 Maths

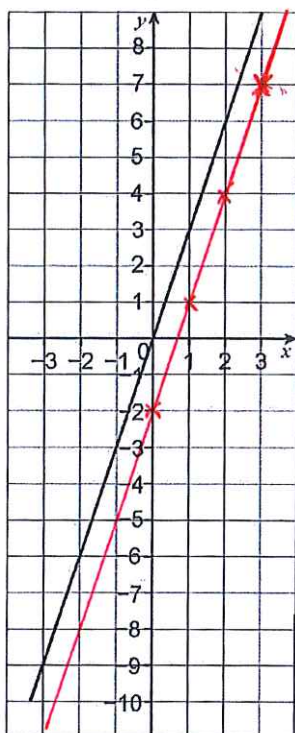
## Unit 10 Test

Graphs

Name: Mark. Scheone

NON-CALCULATOR

- 1 a What is the gradient of the line drawn on the graph?



(M1) correct  $\frac{y_1 - y_2}{x_1 - x_2}$  eg  $\frac{6-0}{2-0}$

(B1)

(A1)

3

- b Complete the table of values for the graph of  $y = 3x - 2$

|   |    |    |    |   |   |   |
|---|----|----|----|---|---|---|
| x | -2 | -1 | 0  | 1 | 2 | 3 |
| y | -8 | -5 | -2 | 1 | 4 | 7 |

b) (B2) & correct  
(B1) error

- c Draw the graph on the grid above.

- d What do you notice about the two lines?

Parallel (A1)

(c) (A1) 'their' points plotted correctly  
(A1) accurate graph

(7 marks)

- 2 Find the inverses of these functions.

a  $x \rightarrow 7x - 2$

$7y - 2 = x$

(B1)  $x+2$  seen

$7y = x+2$

(B2)  $\frac{x+2}{7}$  seen

$y = \frac{x+2}{7}$

b  $x \rightarrow 3(x+1)$

$3(y+1) = x$

$y = \frac{x-3}{3}$

or  $3(y+1) = x$   
 $y+1 = \frac{x}{3}$   
 $y = \frac{x}{3} - 1$

(B1)  $x-3$  or  $\frac{x}{3}$  seen

$3y+3 = x$

$3y = x-3$   
 $y = \frac{x-3}{3}$

(B2)  $\frac{x-3}{3}$  or  $\frac{x}{3} - 1$  seen

c  $x \rightarrow \frac{x-5}{2}$

$\frac{y-5}{2} = x$

(B1)  $2x$  seen

(6 marks)

$y-5 = 2x$

$y = 2x+5$

(B2)  $2x+5$  seen

3 a Draw lines to match the statements on the left with an equation on the right.

|   |                           |                        |     |
|---|---------------------------|------------------------|-----|
| A | not a straight line       | $y = x - 4$            | i   |
| B | y intercept = -4          | $y = 6 - \frac{1}{2}x$ | ii  |
| C | gradient = 2              | $y = 2x - 3$           | iii |
| D | gradient = $-\frac{1}{2}$ | $y = x^2 + 2$          | iv  |
| E | y intercept = 0           | $y = 3x$               | v   |

(B3) all correct

(B2) at least 3 correct

(B1) at least 1 correct

b Which of the above lines (i - v) is parallel to  $y = 2x - 4$ ?

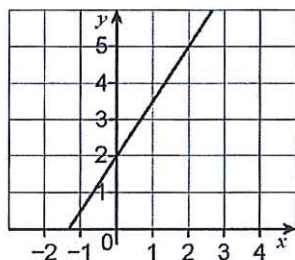
c Which two of the above lines are perpendicular?

Explain how you know.

because the gradients multiply to make -1  
 (or) gradients are negative reciprocal of each other (6 marks)

(A1)  
 $y = 2x - 3$  or (iii)  
 $y = 6 - \frac{1}{2}x$  and  $y = 2x - 3$  (A1)  
 for both

4 a Find the gradient of the line drawn on the grid. Show your method.



(M1) for correct  $\frac{y_1 - y_2}{x_1 - x_2}$  eg  $\frac{5 - 2}{2 - 0}$

$\frac{3}{2}$  (A1)

b Find the y-intercept of this line?

2 (A1)

c Write the equation of this line?

$y = \frac{3}{2}x + 2$  (A1)  
 allow f.e. from (a)/(b)  
 (4 marks)

5 Does the point (4, 47) lie on the line  $y = 10x - 3$ ?

Show your working.

(M1) Substitute  $x = 4$  :

$$\begin{aligned} \text{when } x = 4, y &= 10(4) - 3 \\ &= 40 - 3 \\ &= 37 \end{aligned}$$

(A1)

No, (when  $x = 4$ ,  $y = 37$ )

(2 marks)

$$37 \neq 47$$

6 a Complete these coordinates for the line with equation  $y = -2x - 2$

(0, -2) and (-1, 0) (A1)

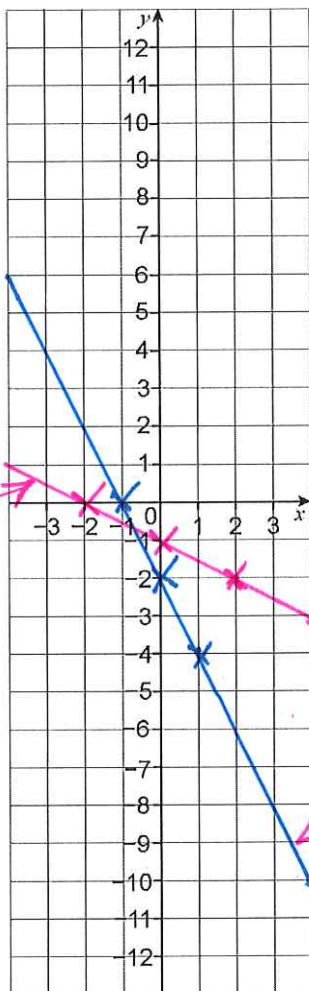
If  $y = 0$ ,  $0 = -2x - 2$  (M1)

$$2x = -2$$

$$x = -1$$

3 marks for part a)

b Draw the line on the grid and label it.



(M1)

Plotting "their" points (even if from a new table which they have shown clearly).

correct

(A1) graph of  $y = -2x - 2$

c What is the equation of the inverse function?

(M1) for swapping  $x \leftrightarrow y$

$$x = -2y - 2$$

$$2y = -x - 2$$

$$y = \frac{-x - 2}{2} \text{ or } y = -\frac{1}{2}x - 1$$

(A1)

d Draw the graph of the inverse function.

(A1) correct graph.

$$\text{of } y = -\frac{1}{2}x - 1$$

(8 marks)

7 Two points (7, 2) and (-3, -3) are connected by a straight line.

a Work out the gradient of the line

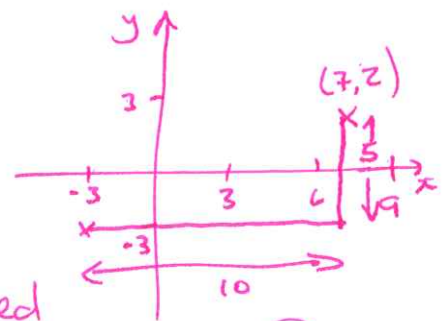
$$M = \frac{\text{Chg } y}{\text{Chg } x} = \frac{-3-2}{-3-7} = \frac{-5}{-10}$$

$$\text{or } \frac{+2-(-3)}{+7-(-3)} = \frac{5}{10}$$

b Work out the gradient of a line which is perpendicular

(M1) Either

$$\frac{1}{2} m = -1 \text{ or } m = \frac{-1}{(\frac{1}{2})}$$

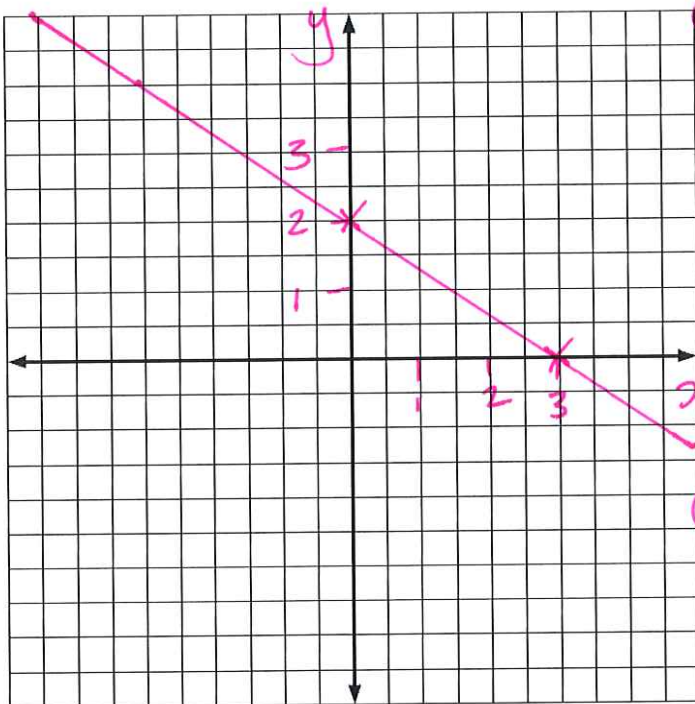


(A1) cao (simplified)  
 $\frac{1}{2}$

(M) -2 (A1)

(4 marks)

8 a On the axis below, draw the line  $2x + 3y = 6$ . Make sure you label your axis clearly.



(M1) attempt at substituting  $x=0$  or  $y=0$

Finding or clearly plotting (0, 2) (A1) and (3, 0) (A1) or any 2 correct points.

(A1) Axes labelled with  $x, y$  & scale.

(A1) Graph drawn correctly.

b Draw any line which is perpendicular to this on the same axis

(A1) Any line with  $m = \frac{3}{2}$  drawn.

c What is the gradient of the line you have drawn?

$\frac{3}{2}$  (A1)

(7 marks)

[End of Review]

[End of Test]

If you've finished, and checked your work, try this challenge.  
YOU WILL **NOT** BE MARKED ON THIS SECTION

### Challenge

- 1 A graph has equation  $y = mx + c$   
Given that it goes through the point (1, 3) what is the relationship between the possible values of  $m$  and  $c$ ?
- 2 **Reflect** Look back at the questions you answered in this unit test.
  - Which took the shortest time to answer? Why?
  - Which took the longest time to answer? Why?
  - Which took the most thought to answer? Why?

#### Q1 hint

Work out a couple of possible equations of the line.  
Then look at the relationship between  $m$  and  $c$ .

At (1, 3):  $y = mx + c$   
 $3 = m(1) + c$   
 $\therefore m + c = 3$