

Y9 Maths

Unit 8 Test

Graphical Solutions

Name: MARK Scheme ☺

1 Here are the equations of three lines.

A: $y + 2 = 4x$

B: $y = 4x + 3$

C: $x + y = -2$

a Write the equations for lines A and C in the form $y = mx + c$

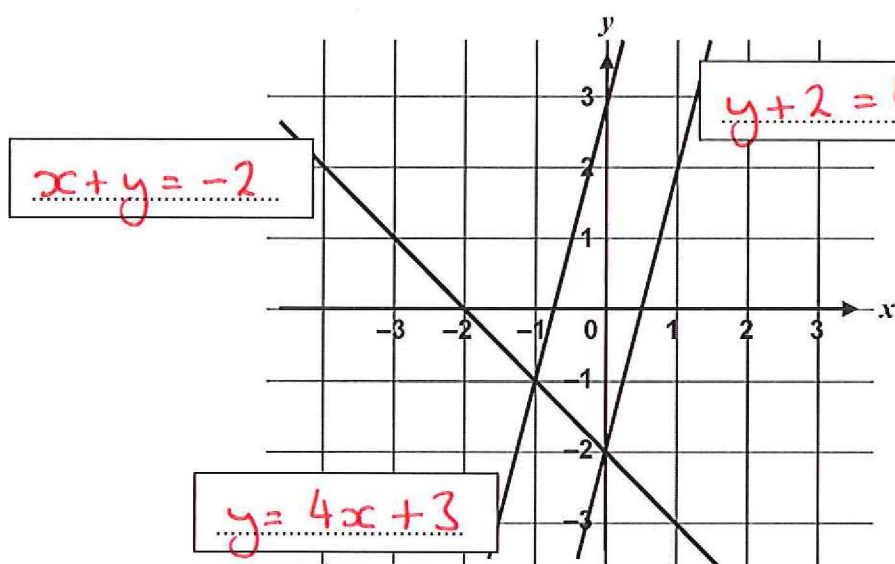
A: $y = 4x - 2$ (A1)

C: $y = -x - 2$ (A1)

b Which two lines have the same gradient? Explain your answer.

(B1) A and B along with a reasonable explanation

c The graph shows the three lines. Label each line on the graph with its equation.



(A2) minus one for each error

d Using the graph, find the solution of this pair of simultaneous equations.

$y + 2 = 4x$

$x + y = -2$

$x = 0$ $y = -2$

or

$(0, -2)$

(A1)

allow ft from part c (A1ft)

(6 marks)

2 Write the following equations in the form $y = mx + c$

a $2y + 6x = 10$

$$y = -3x + 5 \quad (A1)$$

b $4y - 3x = -12$

$$4y = 3x - 12 \quad \text{oe} \quad (M1)$$

$$y = \frac{3x}{4} - 3 \quad (A1)$$

c $\frac{1}{2}y + 5x + 12 = 0$

$$y = -10x - 24 \quad (A1)$$

(4 marks)

3 Solve this pair of simultaneous equations by substitution.

$$3x + y = 15$$

$$y = 2x$$

$$3x + 2x = 15 \quad (M1)$$

$$5x = 15$$

$$x = 3$$

$$y = 2(3)$$

$$y = 6$$

(A1)

(3 marks)

- a Write an algebraic equation for each of the following

3 cups of tea and 2 cups of coffee cost 108AED

(AI)

$$3t + 2c = 108$$

5 cups of tea and 2 cups of coffee cost 148AED

(AI)

$$5t + 2c = 148$$

- b Calculate the cost of one cup of tea and one cup of coffee

$$5t + 2c = 148$$

$$3t + 2c = 108$$

(M1)

$$2t = 40$$

$$t = 20$$

$$3(20) + 2c = 108$$

$$2c = 48$$

$$c = 24$$

(M1)

tea 20

(AI)

coffee 24

(5 marks)

- 5 Solve this pair of simultaneous equations.

$$7x + 4y = 13$$

$$2x - 4y = 14$$

$$9x = 27$$

(M1)

$$x = 3$$

(AI)

$$7(3) + 4y = 13$$

(M1)

$$4y = -8$$

$$y = -2$$

(AI)

(4 marks)

a Circle the pairs of lines have the same y-intercept

i) $y = 2x + 4$

$y - 3x + 4 = 0$

ii)

$y = 2x + 4$

$y + 2x - 4 = 0$

(A1)

iii)

$y = 2x + 4$

$2y = -6x + 8$

(A1)

minus one
for each
error

b State whether each pair of lines are parallel or perpendicular

i) $y = x + 4$

$y + x = 3$

perpendicular

(A1)

ii)

$y - 2x + 1 = 0$

$y - 2x - 4 = 0$

parallel

(A1)

iii)

$y = 3x + 6$

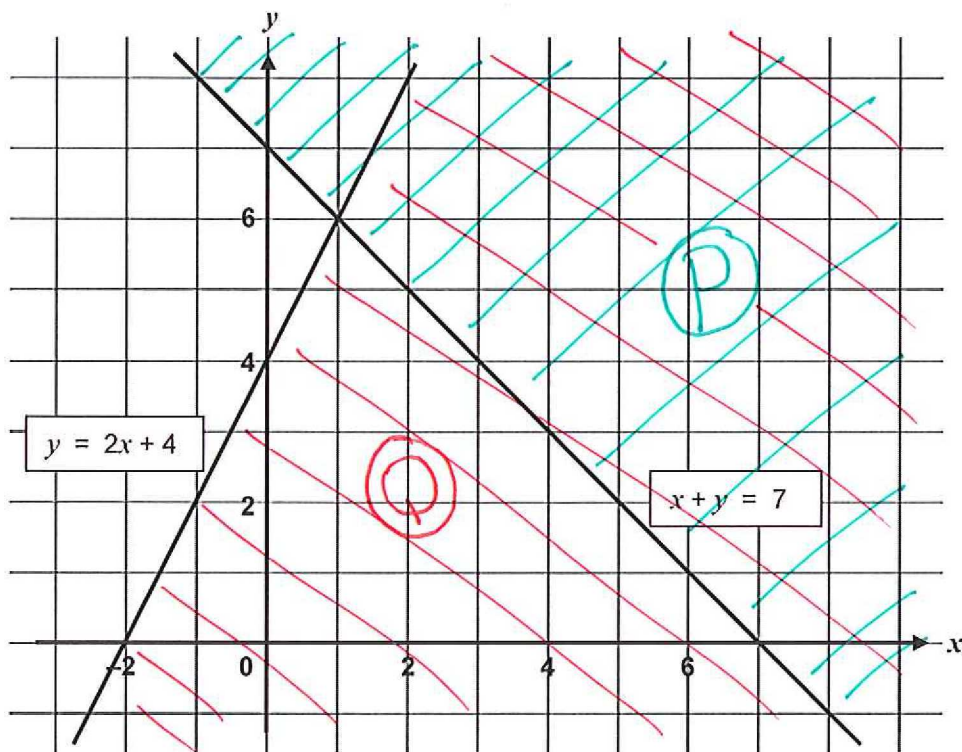
$y = -\frac{1}{3}x + 8$

perpendicular

(A1)

(5 marks)

7 The graph shows the lines $x + y = 7$ and $y = 2x + 4$



a On the graph shade the regions

i $x + y \geq 7$ Label this region P

(A1)

ii $y \leq 2x + 4$ Label this region Q

(A1)

b What can you say about the region where the shading overlaps?

Region satisfies both inequalities

(B1)

(3 marks)

8 Find the equation of the line that passes through the points (4, 17) and (1, 2).

$$\begin{aligned} m &= \frac{17-2}{4-1} \\ &= \frac{15}{3} \quad (M1) \\ &= 5 \quad (A1) \end{aligned}$$

$$y = mx + c$$

$$2 = 5(1) + c \quad (M1)$$

$$c = -3 \quad (A1)$$

$$y = 5x - 3$$

or
equivalent

$$y - 5x + 3 = 0 \quad (A1)$$

(5 marks)

9 Solve this pair of simultaneous equations.

$$3x + 4y = 14$$

$$2x + 3y = 9$$

$$\begin{aligned} 6x + 8y &= 28 \quad (M1) \\ 6x + 9y &= 27 \end{aligned}$$

$$-y = 1 \quad (M1)$$

$$y = -1 \quad (A1)$$

$$3x + 4(-1) = 14 \quad (M1)$$

$$3x = 18$$

$$x = 6 \quad (A1)$$

(5 marks)

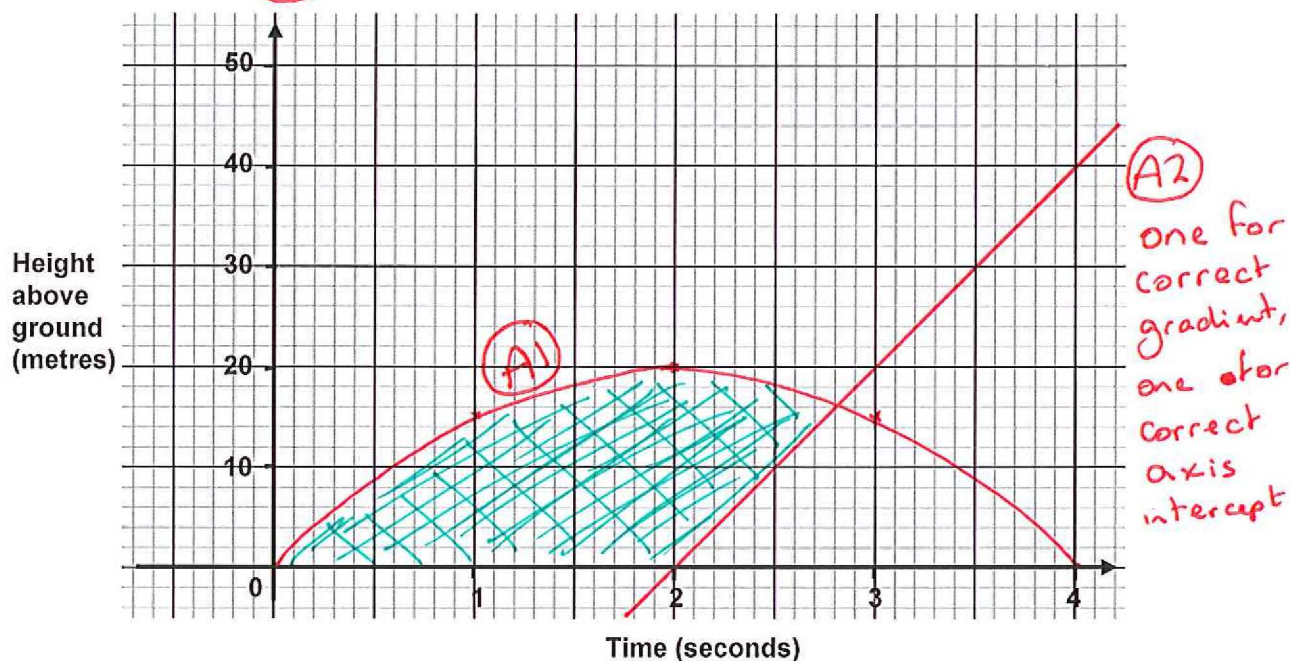
10 A ball was thrown in the air.

a The equation $y = 5(4x - x^2)$ models the path of the ball.

Complete this table of values and draw the path of the ball on the graph.

x	0	1	2	3	4
y	0	15	20	15	0

(A2) minus 1 for each error



b An arrow was fired 2 seconds after the ball was thrown.

Initially, the flight of the arrow was modelled by the straight line $y = 20x - 40$

Plot the path of the arrow on the grid above.

c i At what time might they collide?

(A1)

2.8 ± 0.1 seconds

ii At what height from the ground would they meet or pass each other?

(A1)

16 ± 1 m

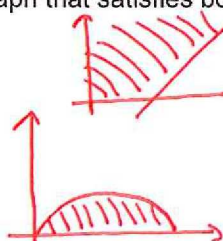
d Shade in the region on the graph that satisfies both of the following inequalities

$y \geq 20x - 40$

(A1)

$y \leq 5(4x - x^2)$

(A1)



(9 marks)