5.12 Solving Simultaneous Equations Graphically: Test Pack

Total Marks

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 On a grid, the line L1 has equation y = 3 and the line L2 has equation x = 4. Give the coordinates of their intersection point.

(Total for Question 1 is 1 mark)

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2 On the same axes, the lines y = 6 and y = x + 2 meet. Work out the x-coordinate where they meet and give the intersection point.

(Total for Question 2 is 2 marks)

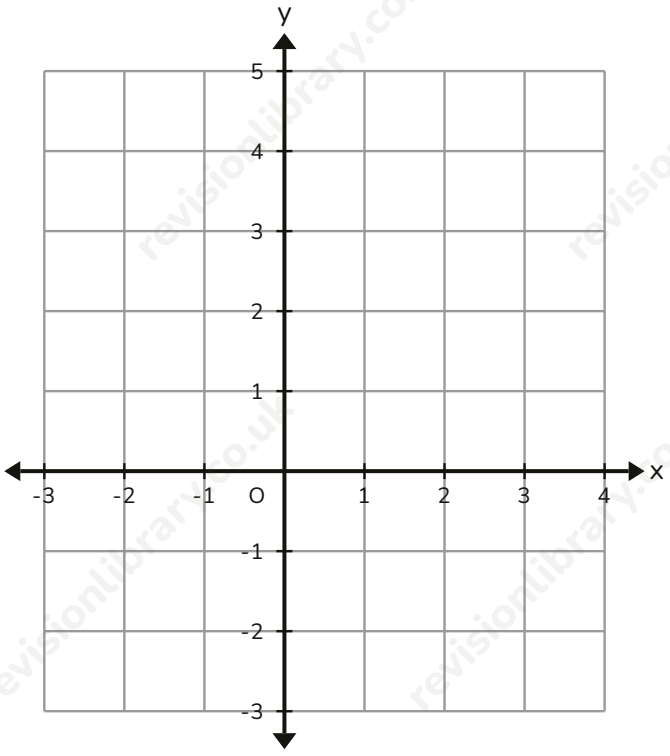
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3 A graph shows the lines y = -x + 4 and y = 1/2 x + 1. Work out the x-coordinate of their intersection.

(Total for Question 3 is 2 marks)

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4 A straight line has equation y = x + 1.



(a) Complete the table of values for y = x + 1. **(2)**

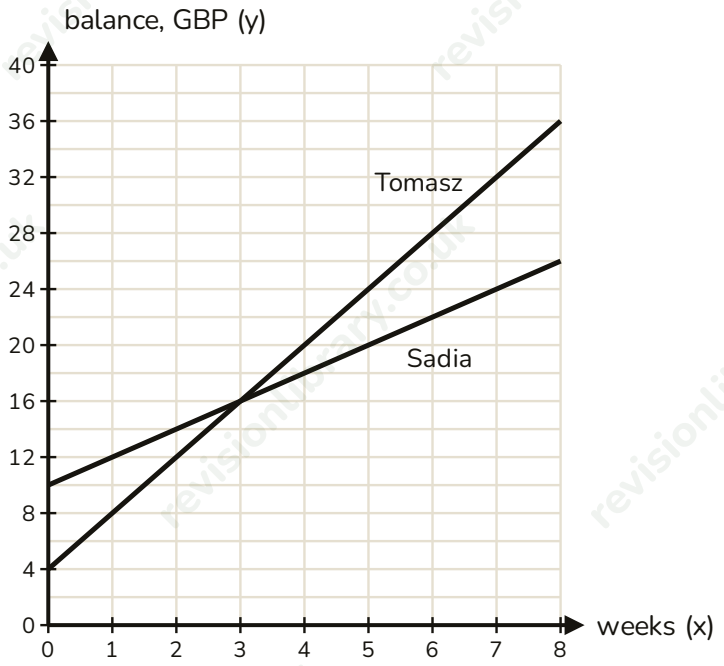
x	-2	-1	0	1	2	3
y	__	__	1	__	__	__

(b) On the grid, draw the graph of y = x + 1 for values of x from -2 to 3. **(2)**

(Total for Question 4 is 4 marks)

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5 The graphs show the value of Sadia's and Tomasz's savings accounts over a number of weeks. Write down the number of weeks after which their savings are equal, and state the balance at that point.

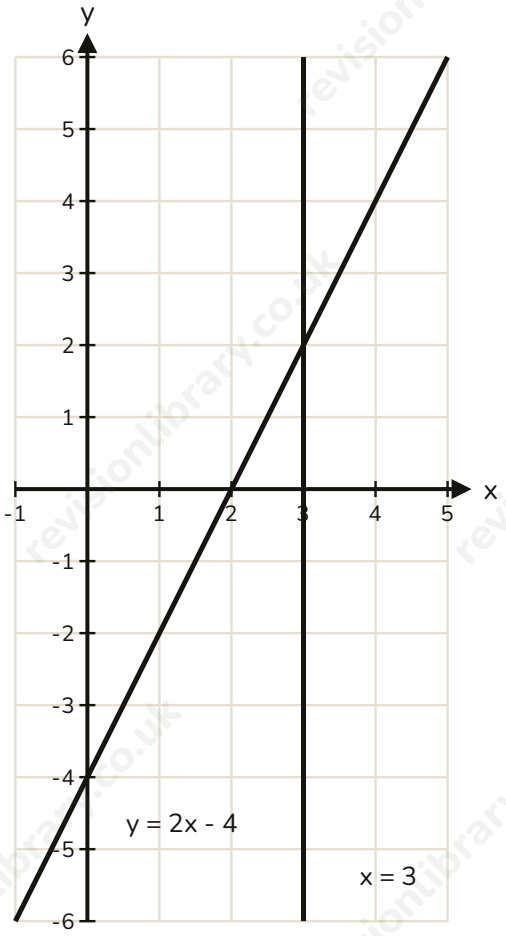


(Total for Question 5 is 2 marks)

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6 The graphs of $x = 3$ and $y = 2x - 4$ are drawn on the grid.

Write down the solution of the simultaneous equations $x = 3$ and $y = 2x - 4$.



(Total for Question 6 is 2 marks)

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7 Two straight lines are drawn from a shop example: the cost y for buying x items from shop A is modelled by y = 5x + 2 (pounds), and from shop B by y = 4x + 6 (pounds). Use algebra to find how many items make the same cost in both shops, and state that cost.

(a) Work out the number of items x for which the cost is the same in both shops. **(2)**

.....

(b) State the common cost in pounds. **(2)**

(Total for Question 7 is 4 marks)

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8 On a grid, draw the graphs of y = -3x + 2 and y = -2x + 1 for values of x from -5 to 7. Use your graphs to solve the simultaneous equations. (State the values of x and y where the lines cross.)

(Total for Question 8 is 3 marks)

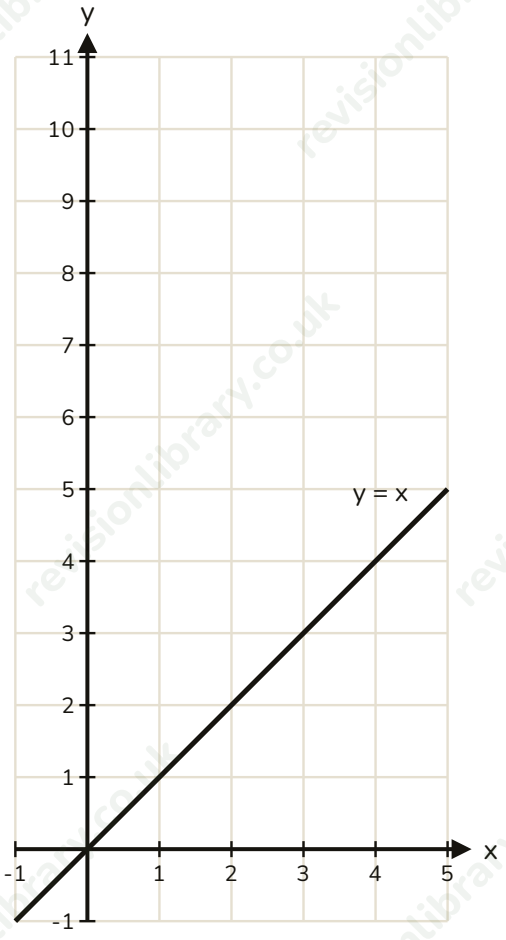
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9 Complete the table of values for y = -2x - 2, for x = 0, 1, 2, 5. Give the four y values in order.

(Total for Question 9 is 2 marks)

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10 The line y = x is already drawn on the grid.



(a) Complete the table of values for y = 9 - 2x. **(2)**

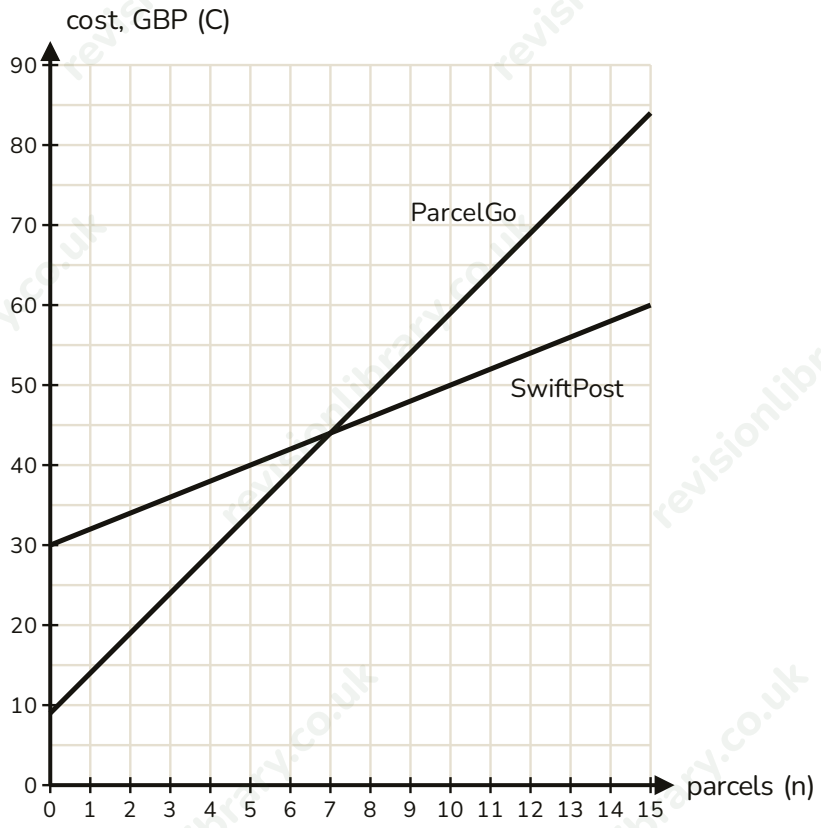
x	-1	0	1	2	3	4
y	—	—	—	—	—	—

(b) The line y = x is already drawn on the grid. Using your table, draw the graph of y = 9 - 2x on the same grid and hence write down the solution of the simultaneous equations y = 9 - 2x and y = x. **(4)**

(Total for Question 10 is 6 marks)

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11 Two courier companies charge for delivering parcels. SwiftPost charges C = 2n + 30 and ParcelGo charges C = 5n + 9, where C is the cost in pounds and n is the number of parcels. The graphs of both charges, for n from 0 to 15, are shown on the grid.



(a) Write down the number of parcels for which the two companies charge the same amount, and state this cost. **(2)**

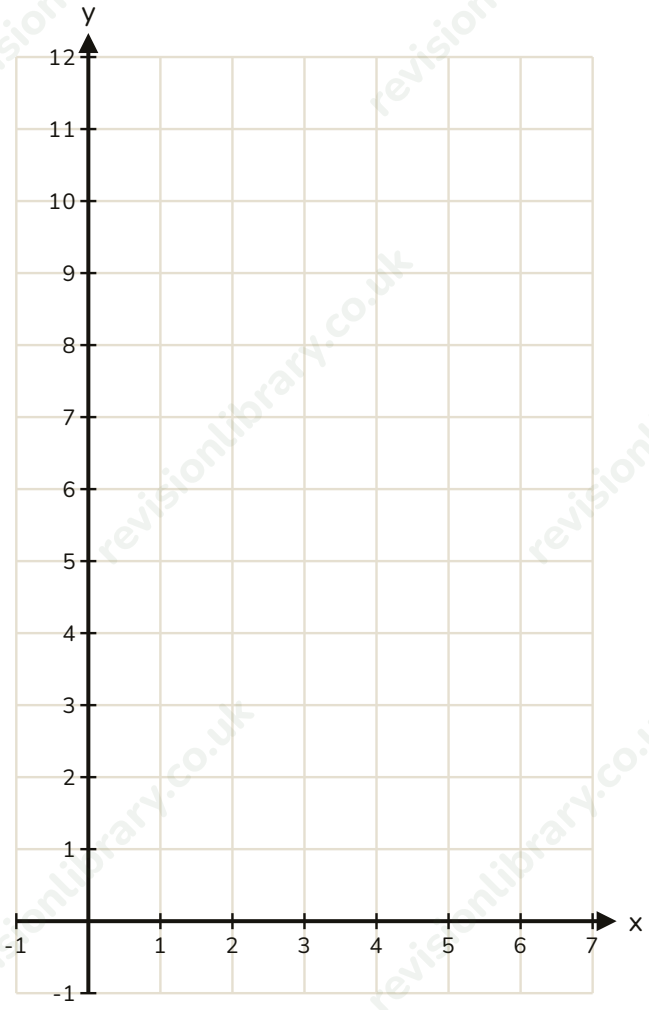
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(b) A customer needs to send 15 parcels. By using the graphs or otherwise, determine which company is cheaper and find the difference in cost. **(3)**

(Total for Question 11 is 5 marks)

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12 Line L1 passes through the points (0, 1) and (5, 11). Line L2 passes through the points (0, 10) and (6, 4).



(a) Line L1 passes through the points (0, 1) and (5, 11). Find the equation of L1 in the form $y = mx + c$. **(2)**

.....

(b) Line L2 passes through the points (0, 10) and (6, 4). Find the equation of L2 in the form $y = mx + c$. **(2)**

.....

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(c) By plotting L1 and L2 on the grid, find the coordinates of the point where L1 and L2 intersect. **(3)**

.....

(Total for Question 12 is 7 marks)

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13 Line L has equation $2x + 3y = 12$. Line M has equation $y = kx - 4$. Given that L and M intersect at a point where $y = 2$, find the value of k.

(Total for Question 13 is 3 marks)

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Mark scheme · 5.12 Solving Simultaneous Equations Graphically: Test Pack

Question 1

(4, 3) cao **B1**

Answer: (4, 3)

Question 2

set 6 = x + 2 and solve **M1**

x = 4 and intersection (4, 6) cao **A1**

Answer: (4, 6)

Question 3

equate: -x + 4 = (1/2)x + 1 or equivalent method **M1**

x = 2 cao **A1**

Answer: 2

Question 4

(a) at least 3 of the 5 missing values correct **B1**

(a) all 5 missing values correct (cao) **B1**

(a) Answer: x = -2, -1, 0, 1, 2, 3 gives y = -1, 0, 1, 2, 3, 4

(b) at least 4 points plotted correctly, ft from table in (a) **M1**

(b) correct ruled straight line drawn from x = -2 to x = 3 **A1**

(b) Answer: Straight line through (-2,-1), (-1,0), (0,1), (1,2), (2,3), (3,4)

Question 5

3 weeks **B1**

balance = £16 **B1**

Answer: After 3 weeks, both accounts hold £16

Question 6

x = 3 **B1**

y = 2 (oe as a coordinate pair) **B1**

Answer: x = 3, y = 2

Question 7

(a) equate 5x + 2 = 4x + 6 or equivalent **M1**

(a) x = 4 cao **A1**

(a) Answer: 4

(b) substitute x = 4 into one equation, e.g. 5*4 + 2 = 22 **M1**

(b) £22 cao **A1**

(b) Answer: £22

Question 8

plots at least two correct points or a table for one line **M1**

both lines drawn correctly **M1**

x = 1, y = -1 cao **A1**

Answer: x = 1, y = -1

Question 9

substitutes at least two x values correctly **M1**

-2, -4, -6, -12 cao **A1**

Answer: -2, -4, -6, -12

Question 10

(a) at least 3 of the 6 values correct **B1**

(a) all 6 values correct (cao) **B1**

(a) Answer: x = -1, 0, 1, 2, 3, 4 gives y = 11, 9, 7, 5, 3, 1

(b) at least 4 points plotted correctly from the table, ft from (a) **M1**

(b) correct ruled straight line y = 9 - 2x drawn from x = -1 to x = 4 **A1**

(b) identifies intersection at (3,3) **B1**

(b) states solution x = 3, y = 3 (ft from their graph) **B1**

(b) Answer: x = 3, y = 3

Question 11

(a) n = 7 parcels **B1**

(a) cost = £44 **B1**

(a) Answer: n = 7 parcels, cost = £44

(b) substitutes n = 15 into both C = 2n + 30 and C = 5n + 9 **M1**

(b) SwiftPost = £60 and ParcelGo = £84 **A1**

(b) concludes SwiftPost is cheaper, by £24 (ft from their two costs) **A1**

(b) Answer: SwiftPost is cheaper by £24

Question 12

(a) finds gradient = (11-1)/(5-0) = 2 **M1**

(a) y = 2x + 1 (oe), using y-intercept 1 from (0,1) **A1**

(a) Answer: y = 2x + 1

(b) finds gradient = (4-10)/(6-0) = -1 **M1**

(b) y = -x + 10 (oe), using y-intercept 10 from (0,10) **A1**

(b) Answer: y = -x + 10

(c) plots L1 correctly using the equation found in (a), ft **M1**

(c) plots L2 correctly using the equation found in (b), ft **M1**

(c) reads off intersection at (3, 7), ft from their graphs **A1**

(c) Answer: (3, 7)

Question 13

substitutes y = 2 into 2x + 3y = 12 to find x = 3 **M1**

substitutes the point (3, 2) into y = kx - 4 **M1**

k = 2 (cao) **A1**

Answer: k = 2

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