5.11 Simultaneous Equations: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Solve the simultaneous equations:

$y = 3x - 2$

$2x + y = 13$

(Total for Question 1 is 4 marks)

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2 Solve the simultaneous equations:

$2x + 3y = 16$

$x + y = 6$

(Total for Question 2 is 4 marks)

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3 Solve the simultaneous equations:

$3x + 2y = 16$

$2x + 3y = 19$

(Total for Question 3 is 5 marks)

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4 Solve the simultaneous equations:

$2x + y = -1$

$x - y = 4$

(Total for Question 4 is 5 marks)

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5 Solve the simultaneous equations $3x + 4y = 1$ and $5x - 2y = 13$.

(Total for Question 5 is 3 marks)

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6 A school sells pencils and rulers. A packet of pencils and 2 rulers costs £5. Two packets of pencils and 3 rulers cost £8. Use simultaneous equations to find the cost of one packet of pencils and the cost of one ruler.

(Total for Question 6 is 4 marks)

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7 Solve the simultaneous equations:

$5x - 2y = 11$

$3x + 2y = 13$

(Total for Question 7 is 5 marks)

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8 A rectangle has length x cm and width y cm. Its perimeter is 54 cm. The length is 3 cm more than twice the width.

Diagram NOT accurately drawn



(a) Write down a pair of simultaneous equations for this information. **(2)**

(b) Solve your equations to find the length and width of the rectangle. **(3)**

(c) Hence work out the area of the rectangle. **(1)**

(Total for Question 8 is 6 marks)

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9 Priya, Kwame and Omar share £120 between them. After Priya gives £10 to Kwame, Priya has twice as much money as Kwame has then. After Kwame gives £5 to Omar, Omar has as much money as Priya started with. Let P, K and O be their initial amounts.

(a) Write down three equations in P, K and O to represent the situation. **(3)**

(b) Solve the equations to find P, K and O. **(6)**

(Total for Question 9 is 9 marks)

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Mark scheme · 5.11 Simultaneous Equations: 1-hour Pack

Question 1

substitutes y = 3x - 2 into the second equation	**M1**
forms and simplifies a single linear equation in x, e.g. 5x - 2 = 13	**M1**
x = 3	**A1**
y = 7 cao	**A1**

Answer: x = 3, y = 7

Question 2

multiplies x + y = 6 by 2 or 3 to match a coefficient, e.g. 3x + 3y = 18	**M1**
subtracts the equations correctly to eliminate a variable	**M1**
x = 2	**A1**
y = 4 cao	**A1**

Answer: x = 2, y = 4

Question 3

multiplies one equation to match a coefficient, e.g. first equation x3	**M1**
multiplies the other equation to match the same coefficient, e.g. second equation x2	**M1**
subtracts or adds correctly to eliminate one variable	**M1**
x = 2	**A1**
y = 5 cao	**A1**

Answer: x = 2, y = 5

Question 4

adds the two equations to eliminate y	**M1**
obtains 3x = 3	**M1**
x = 1	**A1**
y = -3 cao	**A1**
correct check shown, e.g. 2(1) + (-3) = -1	**B1**

Answer: x = 1, y = -3

Question 5

method to eliminate one variable, e.g. multiply equations to eliminate y or x	**M1**
x = 27/13 cao	**A1**
y = -17/13 cao	**A1**

Answer: x = 27/13, y = -17/13

Question 6

form two equations correctly, e.g. p + 2r = 5 and 2p + 3r = 8	**M1**
eliminate one variable correctly, e.g. multiply first equation by 2 then subtract	**M1**
p = 1 cao	**A1**
r = £2 cao	**A1**

Answer: packet of pencils = £1, ruler = £2

Question 7

identifies that adding the equations eliminates y	**M1**
adds the equations correctly to obtain 8x = 24	**M1**
x = 3	**A1**
y = 2 cao	**A1**
correct check shown in both original equations (ft their x and y)	**B1**

Answer: x = 3, y = 2

Question 8

(a) x + y = 27 oe (accept 2x + 2y = 54)	**B1**
(a) x = 2y + 3 oe	**B1**

(a) Answer: x + y = 27 and x = 2y + 3

(b) substitutes x = 2y + 3 into x + y = 27	**M1**
(b) simplifies to 3y + 3 = 27 and solves for y	**M1**
(b) width = 8 cm and length = 19 cm cao	**A1**

(b) Answer: Length = 19 cm, width = 8 cm

(c) 152 cm² (ft their length x width)	**B1**

(c) Answer: 152 cm^2

Question 9

(a) P + K + O = 120	**B1**
(a) P - 10 = 2(K + 10) or equivalent rearrangement	**B1**
(a) P = O + 5 or O + 5 = P (from Kwame gives 5 to Omar)	**B1**

(a) Answer: Equations: P + K + O = 120; P - 10 = 2(K + 10); P = O + 5

(b) substitute P = O + 5 into P - 10 = 2(K + 10) and rearrange to relate O and K	**M1**
(b) use P + K + O = 120 with P = O + 5 to form a second equation in O and K	**M1**
(b) solve the two linear equations to find K and O	**M1**
(b) K = 13 cao	**A1**
(b) O = 51 cao	**A1**
(b) P = 56 cao	**A1**

(b) Answer: Initial amounts: Priya £56, Kwame £13, Omar £51

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