5.11 Simultaneous Equations: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Use elimination to solve these equations.

$2x + y = 11$
$x + 2y = 10$

(Total for Question 1 is 2 marks)

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2 A small theatre has tickets for adults and children. An adult ticket costs £7 and a child ticket costs £3.

On Monday the theatre sold 50 tickets and took £274.

Let a be the number of adult tickets and c the number of child tickets. Write the simultaneous equations and find a and c.

(Total for Question 2 is 5 marks)

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3 Solve the simultaneous equations $2x + y = 7$ and $x - y = 1$.

(Total for Question 3 is 3 marks)

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4 Two pens and three pencils cost £2.20 in total. One pen and one pencil cost £0.90 in total.

(a) Using p for the cost of a pen in pounds and c for the cost of a pencil in pounds, write down a pair of simultaneous equations for this information. **(2)**

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(b) Solve your equations to find the cost of a pen and the cost of a pencil. **(3)**

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(Total for Question 4 is 5 marks)

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5 Solve these simultaneous equations by elimination. Show your working clearly.

$4x + 3y = 25$
$2x - y = 4$

(Total for Question 5 is 6 marks)

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6 The sum of two numbers is 24. Three times the smaller number is 4 more than the larger number. Let x be the larger number and y be the smaller number. Form and solve a pair of simultaneous equations to find the two numbers.

(Total for Question 6 is 5 marks)

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Mark scheme · 5.11 Simultaneous Equations: 30-minute Pack

Question 1

eliminate a variable, e.g. multiply first equation by 2 and subtract or subtract equations to get x or y	**M1**
x = 4, y = 3 cao	**A1**

Answer: x = 4, y = 3

Question 2

form equations: a + c = 50 and 7a + 3c = 274	**M1**
eliminate a or c, e.g. multiply first equation by 3 and subtract from second to get 4a = 274 - 150 = 124	**M1**
a = 31 cao	**A1**
substitute a = 31 into a + c = 50 to find c	**M1**
c = 19 cao	**A1**

Answer: a = 31, c = 19

Question 3

method to eliminate y, e.g. add the equations or substitute correctly	**M1**
x = 8/3 cao	**A1**
y = 5/3 cao	**A1**

Answer: x = 8/3, y = 5/3

Question 4

(a) 2p + 3c = 2.20 oe	**B1**
(a) p + c = 0.90 oe	**B1**

(a) Answer: 2p + 3c = 2.20 and p + c = 0.90

(b) rearranges p + c = 0.90 to p = 0.90 - c (or equivalent elimination step)	**M1**
(b) substitutes to form a single equation in one variable, e.g. 2(0.90 - c) + 3c = 2.20	**M1**
(b) pen = £0.50 and pencil = £0.40 cao	**A1**

(b) Answer: Pen = £0.50, pencil = £0.40

Question 5

multiply second equation by 3 to align y: 6x - 3y = 12	**M1**
add to first equation to eliminate y giving 10x = 37	**M1**
x = 37/10 (or 3.7) cao	**A1**
substitute x = 37/10 into 2x - y = 4 to find y	**M1**
y = 17/5 cao	**A1**
final answers x = 37/10, y = 17/5 cao	**A1**

Answer: x = 37/10, y = 17/5

Question 6

x + y = 24	**B1**
3y = x + 4 oe	**B1**
combines the equations to form a single equation in one variable, e.g. 3y = (24 - y) + 4	**M1**
y = 7	**A1**
x = 17 cao	**A1**

Answer: Larger number = 17, smaller number = 7

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