2.17 Introduction to Simultaneous Equations: Test Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Solve this simple pair of equations by substitution.

(a) Substitute $y = 2x$ into $x + y = 9$ and solve for x, then find y. **(3)**

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2 Solve the simultaneous equations by substitution.

$y = 4x + 4$

$3x + 3y = -33$

(3)

3 Solve the simultaneous equations.

$4x + y = 10$

$3x + y = 8$

(3)

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4 Solve the simultaneous equations by substitution.

$y = x$

$3x + y = 8$

(3)

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5 Is $x = 4$, $y = 5$ a solution of both of these equations? Show your working.

$x + 4y = 24$

$x - y = 0$

(2)

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6 Solve the simultaneous equations.

$2x + 3y = 14$

$x + 2y = 9$

(4)

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7 Is $x = 8$, $y = 2$ a solution of both of these equations? Show your working.

$2x + 3y = 22$

$2x - y = 15$

(2)

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8 Is x = 3, y = 1 a solution of both of these equations? Show your working.

$3x + 2y = 11$

$4x - y = 11$

(2)

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9 2 notebooks and 3 rulers cost £15.

1 notebook and 2 rulers cost £8.

Work out the cost of one notebook and the cost of one ruler.

(4)

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10 Solve the simultaneous equations.

$4x + 2y = 46$

$2x + 2y = 28$

(3)

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11 Solve the pair of equations by elimination, multiplying one equation first.

$x + 2y = 8$ and $2x + y = 7$. Find x and y.

(3)

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12 The sum of two numbers is 15. The larger number is 3 more than twice the smaller number. Find the two numbers.

(3)

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13 A cinema charges a pounds for an adult ticket and c pounds for a child ticket.
3 adult tickets and 2 child tickets cost £23 in total.
2 adult tickets and 5 child tickets cost £30 in total.
Form a pair of simultaneous equations and solve them to find a and c.

(4)

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14 Stretch. The larger of two numbers exceeds the smaller by 6. Twice the smaller number plus three times the larger number equals 58. Find both numbers.

(4)

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15 The pair $x = 5$, $y = 1$ is claimed to be a solution of $x - y = 4$. State whether this claim is true.

(1)

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16 Given $x + y = 9$ and $x = 5$, work out y.

(1)

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Mark scheme · 2.17 Introduction to Simultaneous Equations: Test Pack

Question 1

(a) substitution shown: x + 2x = 9 or equivalent	M1
(a) correct method to find x: 3x = 9, x = 3	M1
(a) correct y value y = 6 cao	A1

(a) Answer: **x = 3, y = 6**

Question 2

substitutes 4x + 4 for y in the second equation	M1
solves the resulting linear equation for x	M1
x = -3, y = -8 cao	A1

Answer: **x = -3, y = -8**

Question 3

adds or subtracts the equations to eliminate one letter	M1
x = 2 (or y = 2) correct	A1
x = 2, y = 2 cao	A1

Answer: **x = 2, y = 2**

Question 4

substitutes x for y in the second equation	M1
solves the resulting linear equation for x	M1
x = 2, y = 2 cao	A1

Answer: **x = 2, y = 2**

Question 5

substitutes both values into one equation	M1
No, with both equations checked	A1

Answer: **No**

Question 6

multiplies one or both equations so that one letter has matching coefficients	M1
eliminates a letter correctly	M1
one correct value	A1
x = 1, y = 4 cao	A1

Answer: **x = 1, y = 4**

Question 7

substitutes both values into one equation	M1
No, with both equations checked	A1

Answer: **No**

Question 8

substitutes both values into one equation	M1
Yes, with both equations checked	A1

Answer: **Yes**

Question 9

forms one equation, eg 2x + 3y = 15	M1
forms the second equation and attempts to eliminate	M1
one correct cost	A1
notebook = £6, ruler = £1 cao	A1

Answer: **notebook = £6, ruler = £1**

Question 10

adds or subtracts the equations to eliminate one letter	M1
x = 9 (or y = 5) correct	A1
x = 9, y = 5 cao	A1

Answer: **x = 9, y = 5**

Question 11

multiply the first equation by 2 to get 2x + 4y = 16	M1
subtract to eliminate x, e.g. 3y = 9	M1
x = 2, y = 3 cao	A1

Answer: **x = 2, y = 3**

Question 12

correct equations set up, e.g. n + (2n + 3) = 15 where n is the smaller number	M1
correct method to solve, e.g. 3n = 12	M1
4 and 11 cao	A1

Answer: **The numbers are 4 and 11**

Question 13

correct equations formed: 3a + 2c = 23 and 2a + 5c = 30	M1
correct elimination method, e.g. multiply first by 5 and second by 2 to eliminate c	M1
a = 5 found	M1
a = 5, c = 4 cao	A1

Answer: **Adult ticket = £5, child ticket = £4**

Question 14

correct expression for the larger number in terms of the smaller, e.g. larger = s + 6	M1
correct equation formed, e.g. 2s + 3(s + 6) = 58	M1
correct method to solve, e.g. 5s = 40	M1
8 and 14 cao	A1

Answer: **The numbers are 8 and 14**

Question 15

True, because 5 - 1 = 4	B1

Answer: **True**

Question 16

y = 4 cao	B1

Answer: **y = 4**

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