



KS3.M-A17 Introduction to Simultaneous Equations

AQA KS3.M-A17 · Calculators not allowed · about 45 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)

2 Solve the pair of equations using elimination.

(a) Eliminate x by subtracting the second equation from the first and find y , then x . (3)

3 Solve this pair by substitution where one equation is rearranged first.

(a) Rearrange $3x - y = 7$ to express y in terms of x , substitute into $x + 2y = 4$ and solve. (3)

4 Solve by elimination after multiplying one equation.

(a) Multiply the first equation so you can eliminate x or y , then solve. (3)

5 A practical context. Solve by substitution.

(a) Write equations, substitute and find k and Yusuf's number. (4)

6 Solve the pair where elimination needs different multipliers.

(a) Use elimination by making coefficients of x or y equal and solve both values. (4)

Mark scheme · KS3.M-A17 Introduction to Simultaneous Equations

Question 1

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

Question 2

- (a) **M1** correct elimination leading to $4y = 8$ or equivalent
- (a) **M1** correct method to find y : $y = 2$
- (a) **A1** substitute to find $x = 7/2$ or 3.5 cao
- (a) **Answer: $x = 7/2$, $y = 2$**

Question 3

- (a) **M1** rearrangement to get $y = 3x - 7$ and substitution into the second equation
- (a) **M1** correct algebra to a single equation in x , e.g. $x + 2(3x - 7) = 4$ giving $7x = 18$
- (a) **A1** correct values $x = 18/7$ and $y = 5/7$ cao
- (a) **Answer: $x = 18/7$, $y = 5/7$**

Question 4

- (a) **M1** multiply first equation by 3 to give $3x + 12y = 33$ or equivalent
- (a) **M1** subtract the second equation correctly to find $14y = 32$
- (a) **A1** $y = 16/7$ and $x = 13/7$ cao
- (a) **Answer: $x = 13/7$, $y = 16/7$**

Question 5

- (a) **M1** correct equations: Yusuf = $k + 3$ and $k + (k + 3) = 31$ or equivalent
- (a) **M1** attempt to solve: $2k + 3 = 31$ leading to $2k = 28$
- (a) **M1** $k = 14$ found
- (a) **A1** Yusuf has 17 stamps cao
- (a) **Answer: Amina has 14 stamps, Yusuf has 17 stamps**

Question 6

- (a) **M1** correct multiplication to make a coefficient equal, e.g. multiply first by 3 and second by 4 to eliminate x producing $12x + 15y = 6$ and $12x - 8y = 44$
- (a) **M1** correct elimination to find $23y = -38$ or equivalent
- (a) **M1** correct value for y , $y = -38/23$
- (a) **A1** substitute to find $x = 59/23$ cao
- (a) **Answer: $x = 59/23$, $y = -38/23$**