

## SIMULTANEOUS EQUATIONS

### Pearson Edexcel - Tuesday 11 June 2019 - Paper 3 (Calculator) Foundation Tier

1.

30	$x = 1, y = -2$	M1	for a correct method to eliminate either $x$ or $y$ or method leading to substitution (condone one arithmetic error)	
		M1	(dep M1) for substituting found value in one of the equations <b>OR</b> correct method after starting again (condone one arithmetic error)	
		A1	cao	

### Pearson Edexcel - Tuesday 6 November 2018 - Paper 1 (Non-Calculator) Foundation Tier

2.

25	$x = 4.5, y = -1.5$	M1	correct process to eliminate one variable (condone one arithmetic error)	Fractions do not need to be in simplest form
		M1	(dep M1) for substituting found value in one of the equations <b>OR</b> correct process after starting again (condone one arithmetic error)	
		A1	for $x = 4.5, y = -1.5$ oe	

### Pearson Edexcel - Wednesday 8 November 2017 - Paper 3 (Calculator) Foundation Tier

3.

27		$x = 1.5, y = 3.5$	M1	for correct method to eliminate one variable (condone one arithmetic error)
			M1	(dep) for substituting found value in one of the equations or correct method after starting again (condone one arithmetic error)
			A1	for both $x = 1.5$ and $y = 3.5$

### Pearson Edexcel – Specimen 1 - Paper 1 (Non-Calculator) Foundation Tier

4.

29		$x=7, y=-3$	M1	for correct process to eliminate one variable (condone one arithmetic error)
			M1	(dep) for substituting found value in one of the equations or appropriate method after starting again (condone one arithmetic error)
			A1	for both correct solutions

**OCR Monday 11 November 2019 – Afternoon (Calculator) Foundation Tier**

5.

16			$[x =] 3$ $[y =] -1$	3	<b>M1</b> for correct method to eliminate one variable <b>B1</b> for $x = 3$ <b>B1</b> for $y = -1$ If 0 scored <b>SC1</b> for correct substitution in a given equation and correct evaluation to find other variable	Allow one error in addition or subtraction of terms or in rearrangement  If previously rearranged must be correct rearrangement
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**OCR Wednesday 8 November 2017– Morning (Calculator) Foundation Tier**

6.

19			$a + b = 110$ oe	1	Accept $2a + b = 180$  <b>FT</b> from <i>their</i> $a$ or $b$ seen correctly substituted in one equation  If 0 scored <b>SC1</b> for any $a$ and $b$ (not $a = 70$ and $b = 40$ ) as answer that sum to 110	Ignore units
			$4a + 2b = 360$ oe	1		
			$a = 70$	1		
			$b = 40$	1		

**AQA Tuesday 21 May 2019 – Morning (Non-Calculator) Foundation Tier**

7.

19(a)	5	B1	
	<b>Additional Guidance</b>		
	Condone $10 - 5 = 5$		B1
	Condone $x = 5$		B1
	$\frac{10}{2}$		B0
19(b)	-10	B1	

<b>19(c)</b>	Unsimplified expression in $a$ , $b$ and $c$ which would evaluate to 23	M1	eg $2(4a - 2b) + a + c$ or $8a - 4b + a + c$ or $11(a + c) - (4a - 2b)$ or $11a + 11c - 4a + 2b$
	Simplified expression in $a$ , $b$ and $c$ which would evaluate to 23	A1	eg $9a - 4b + c$ $7a + 2b + 11c$ SC2 Values assigned to $a, b$ and $c$ which satisfy original equations and expression given which has value 23 eg $a = 3, b = 1, c = 0$ and $7a + 2b + c$
	<b>Additional Guidance</b>		
	There are infinitely many correct solutions. Allow solutions where the coefficients are not integers if initial working is shown. eg $3(4a - 2b) - \frac{7}{3}(a + c) = \frac{29}{3}a - 6b - \frac{7}{3}c$		M1A1
	$5a - 2b + c + 10 = 23$		M1A1
	Condone '= 23' after the expression		
Answer using only two variables eg $2.3(4a - 2b)$		M0A0	

AQA Monday 12 November 2018 – Morning (Calculator) Foundation Tier

8.

<b>23</b>	<b>Alternative method 1 – Elimination</b>		
	$2t + c = 3.4(0)$ and $2t + 8c = 14.6(0)$	M1	oe $8t + 4c = 13.6(0)$ and $t + 4c = 7.3(0)$ allow one error in scaling equations
	$8c - c = 14.6(0) - 3.4(0)$ or $7c = 11.2(0)$	M1dep	oe $8t - t = 13.6(0) - 7.3(0)$ or $7t = 6.3(0)$
	$c = 1.6(0)$ or 160	A1	$t = 0.9(0)$ or 90
	(Tea) £0.90 or 90p and (Coffee) £1.60 or 160p	A1	must be correct units
	<b>Alternative method 2 – Substitution</b>		
	$t = \frac{3.4(0) - c}{2}$ or $t = 7.3(0) - 4c$	M1	oe $c = 3.4(0) - 2t$ or $c = \frac{7.3(0) - t}{4}$
	$\frac{3.4(0) - c}{2} + 4c = 7.3(0)$ or $2(7.3(0) - 4c) + c = 3.4(0)$	M1dep	oe $t + 4(3.4(0) - 2t) = 7.3(0)$ or $2t + \frac{7.3(0) - t}{4} = 3.4(0)$
	$c = 1.6(0)$ or 160	A1	$t = 0.9(0)$ or 90
	(Tea) £0.90 or 90p and (Coffee) £1.60 or 160p	A1	must be correct units

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<b>23 cont</b>	<b>Alternative method 3</b>		
	A correctly evaluated trial of a value for tea and a value for coffee satisfying one statement and then substituted into the other statement	M1	eg $\pounds 1 + \pounds 1 + \pounds 1.40 = 3.4(0)$ and $\pounds 1 + 4 \times \pounds 1.40 = 6.6(0)$
	A different correctly evaluated trial	M1dep	
	(Tea) 0.9(0) or 90 and (Coffee) 1.6(0) or 160 or a correctly evaluated trial with (Tea) 0.9(0) or 90 and (Coffee) 1.6(0) or 160	A1	
	(Tea) $\pounds 0.90$ or 90p and (Coffee) $\pounds 1.60$ or 160p	A1	must be correct units
	<b>Additional Guidance</b>		
	Ignore incorrect trials alongside correct trials		
	Condone $\pounds 1.60p$ or $\pounds 0.90p$		
	Allow working in pence		
	In Alt1 the 2nd method mark can be scored following one error in scaling equations in the 1st method mark		
	Both prices correct with no or insufficient working		M1M1A1A1
Tea 160p and Coffee 90p on answer line with no or insufficient working		M1M1A1A0	
One price correct (with other price incorrect) and no or insufficient working eg Tea 90p and Coffee 140p with no or insufficient working		M0M0A0A0	

**AQA Thursday 24 May 2018 – Morning (Non-Calculator) Foundation Tier**

<b>15</b>	<b>Alternative method 1</b>		
	3 × 7 or 21 or 40 ÷ 2 or 20	M1	oe
	21 and 20	A1	
	<b>Alternative method 2 – works out and uses correct possible values for <math>a</math>, <math>b</math>, <math>x</math> and <math>y</math></b>		
	Substitute values into $9a + 3b$ that satisfy $3a + b = 7$ or substitute values into $3x + 4y$ that satisfy $6x + 8y = 40$	M1	eg $a = 2$ and $b = 1$ substituted into $9a + 3b$ or $x = 4$ and $y = 2$ substituted into $3x + 4y$
	21 and 20	A1	Correct evaluation of their expressions with correct values for the letters
	<b>Additional Guidance</b>		
	Beware 21 or 20 coming from wrong working		
	Accept either of 21 or 20 seen if there is also an explanation that the other value is one more or one less (as appropriate) than the calculated one		M1A1
	Use the scheme that awards the better mark		
$a = 3$ and $b = -2$ then $9 \times 3 + 3 \times -2$ or $x = 0$ and $y = 5$ then $3 \times 0 + 4 \times 5$		M1	

AQA Thursday 25 May 2017– Morning (Non-Calculator) Foundation Tier

28	<b>Alternative method 1</b>		
	$2x + x = 18 + 6$	M1	oe Eliminates a variable Implied by $3x = n$ , where $n > 18$
	$3x = 24$ or $x = 8$	A1	oe
	$x = 8$ and $y = 2$	A1	
	<b>Alternative method 2</b>		
	$y - 2y = 18 - 2 \times 6$ or $y - 2y = 18 - 12$ or $y + 2y = 18 - 2 \times 6$ or $y + 2y = 18 - 12$	M1	oe Eliminates a variable Implied by $2x - 2y = 12$ followed by $3y = m$ , where $m < 18$
	$3y = 6$ or $-3y = -6$ or $y = 2$ or $-y = -2$	A1	oe
	$x = 8$ and $y = 2$	A1	
	<b>Alternative method 3</b>		
	$\frac{18 - y}{2} = y + 6$ or $18 - 2x = x - 6$	M1	oe Eliminates a variable
	$3x = 24$ or $x = 8$ or $3y = 6$ or $y = 2$	A1	oe Collects terms
	$x = 8$ and $y = 2$	A1	

AQA Sample Paper 1– Morning (Non-Calculator) Foundation Tier

11.

<b>16</b>	<b>Alternative Method 1</b>		
	$24.5 \div 7$ or $3.5(0)$	M1	
	$63 - 24.5$ or $38.5$	M1	
	their $38.5 \div$ their $3.5$	M1	
	11	A1	
	<b>Alternative Method 2</b>		
	$24.5 \div 7$ or $3.5(0)$	M1	
	$63 \div$ their $3.5$ or $18$	M1	
	their $18 - 7$	M1	
	11	A1	
	<b>Alternative Method 3</b>		
	$63 \div 24.5$ or $\frac{18}{7}$	M1	oe
	$7 \times$ their $\frac{18}{7}$ or $18$	M1	
	their $18 - 7$	M1	
	11	A1	