Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Simultaneous equations

Time allowed: 45 minutes

Subject code **0580**

Mathematics

Questions from Paper 1, Paper 2, Paper 3 and Paper 4

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
You may use a calculator.

Total marks

/ 38

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 38 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1 Solve the simultaneous equations.

You must show all your working.

$$3x + 5y = 5$$
$$2x - 5y = 45$$

$x =$ .....

$y =$ .....

[2]

Simultaneous equations Click for more variations

1	$x = 10$ $y = -5$	**2**	**B1** for each

2 Solve the simultaneous equations.

$$x - 3y = 7$$
$$2x - 3y = 11$$

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$x =$ .....

$y =$ ..... [2]

Simultaneous equations Click for more variations

2	[x =] 4 [y =] –1	**2**	**B1** for each

3 Solve the simultaneous equations.
You must show all your working.

$$2x + 3y = 13$$
$$x + 2y = 9$$

x = ...

y = ... [3]

Simultaneous equations Click for more variations

3	Correctly eliminating one variable [x =] −1 and [y =] 5	**M1** **A1** **A1**	If zero scored, **SC1** for 2 values that satisfy one of the original equations **or** **SC1** if no working shown, but 2 correct answers given

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4 Find the values of x when $6x+y=10$ and $y=x^2-3x+10$.

$x =$ ..... or $x =$ ..... [3]

Simultaneous equations Click for more variations

4	0 and –3	**3**	**B2** for $x^2 + 3x$ [= 0] or better or **M1** for $10 - 6x = x^2 - 3x + 10$ oe or for correct simplification of *their* quadratic to the form $ax^2 + bx + c$ [= 0] or better or finding $y = 28$ and $y = 10$

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5 Solve the simultaneous equations.

$$4t - 3w = 11$$
$$6t + 2w = -3$$

$t =$ .....

$w =$ ..... [4]

Simultaneous equations Click for more variations

5	$[t =]0.5$ $[w =]-3$	**4**	**M1** for correctly equating one set of coefficients **M1** for correct method to eliminate one variable OR **M1** for making t or w the subject of one equation **M1** for substitution of t or w from *their* rearranged equation **A1** for $t = 0.5$ **A1** for $w = -3$ If A0 scored **SC1** for 2 values satisfying one of the original equations

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6 The line $y = x + 1$ intersects the curve $y = x^2 + x - 3$ at two points.

Find the coordinates of the two points.

(..... , ...)

(..... , ...) [4]

Simultaneous equations Click for more variations

6	(2, 3) and (–2, –1)	**4**	**B3** for $x = 2$ and $x = -2$ or **B2** for $x^2 - 4[=0]$ or better or for (2, 3) or (–2, –1) or **M1** for $x + 1 = x^2 + x - 3$ oe

7 Solve the simultaneous equations.
You must show all your working.

$$\frac{3x}{2} + 5y = 5$$
$$4x - 3y = 46$$

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$x =$ .....

$y =$ ..... [4]

Simultaneous equations Click for more variations

7	Correctly equating one set of coefficients	**M1**	
	Correct method to eliminate one variable	**M1**	
	$x = 10$, $y = -2$	**A2**	**A1** for $x = 10$ **A1** for $y = -2$ If M0 scored **SC1** for 2 values satisfying one of the original equations.

8 Jim buys 15 apples and 10 pears for $42.50 .
Li buys 4 apples and 5 pears for $16.

Write down a pair of simultaneous equations and solve them to find the cost of one apple and the cost of one pear.

Apple $ .....

Pear $ .....
[5]

Simultaneous equations Click for more variations

8	$15a + 10p = 42.5$ oe $4a + 5p = 16$ oe	**2**	**B1** for each
	[*apple* =] 1.5[0] cao [*pear* =] 2[.00] cao	**3**	**M1FT** for correctly eliminating one variable from *their* equations. **A1** for 1.5 **A1** for 2 If M1 A0 or M0 scored, **SC1** for two positive costs which satisfy one of original conditions

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9 Solve the simultaneous equations.
You must show all your working.

$$4y + 3x = 13$$
$$y = x^2 - 18$$

$x =$ ..... $y =$ .....

or $x =$ ..... $y =$ ..... [5]

Simultaneous equations Click for more variations

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9	$4x^2 + 3x - 85[= 0]$ or $16y^2 - 113y + 7[= 0]$ oe simplified	**M2**	**M1** for $4(x^2 - 18) + 3x = 13$ or $x^2 - 18 = \frac{13 - 3x}{4}$ or $y = \left(\frac{13 - 4y}{3}\right)^2 - 18$ oe or better
	correct method to solve *their* quadratic equation e.g. factors, quadratic formula, completing the square	**M1**	$\frac{-3 \pm \sqrt{3^2 - 4 \times 4 \times -85}}{2 \times 4}$ oe, $(4x - 17)(x + 5)$ $\frac{-(-113) \pm \sqrt{(-113)^2 - 4 \times 16 \times 7}}{2 \times 16}$ oe, $(16y - 1)(y - 7)$
	$x = -5$ $y = 7$ $x = \frac{17}{4}$ oe $y = \frac{1}{16}$ oe	**B2**	**B1** for one correct pair or two correct x values or two correct y values If B0 scored and at least 2 method marks scored, **SC1** for correct substitution of both of their x values or their y values into $4y + 3x = 13$ or $y = x^2 - 18$

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10 A shop sells pens and notebooks.
The cost of a pen is p cents and the cost of a notebook is n cents.

(a) On Monday, the shop sells 5 pens and 4 notebooks for 450 cents.

Complete the equation.

$5p + 4n =$ ..... [1]

(b) On Tuesday, the shop sells 10 pens and 3 notebooks for 525 cents.

Write this information as an equation.

..... = ... [2]

(c) Solve your two equations to find the cost of a pen and the cost of a notebook.
You must show all your working.

Cost of a pen = ... cents

Cost of a notebook = ... cents [3]

(a) Simultaneous equations (b) Simultaneous equations (c) Simultaneous equations Click for more variations

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10(a)	450	**1**	
10(b)	$10p + 3n = 525$	**2**	**M1** for $10p + 3n$
10(c)	for correctly eliminating one variable	**M1**	**FT**
	$[p] = 30$	**A1**	
	$[n] = 75$	**A1**	If 0 scored, **SC1** for 2 values satisfying one of the original equations or **SC1** for both correct but no working

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