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

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Changing the subject when it appears twice

Time allowed: 45 minutes

Subject code **0580**

Mathematics

Paper 2 (Extended)

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

/ 34

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 34 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 Rearrange the formula $J = mv - mu$ to make m the subject.

Answer $m =$ [2]

Changing the subject when it appears twice Click for more variations

1	$m = \dfrac{J}{v-u}$	2	**M1** $m(v-u)$ seen

2 $P = 2r + \pi r$

Rearrange the formula to write r in terms of P and π.

$r =$ ..... [2]

Changing the subject when it appears twice Click for more variations

2	$\dfrac{P}{2+\pi}$	**2**	**M1** for $P = r(2+\pi)$

3 $ap = px + c$

Write p in terms of a, c and x.

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Answer $p =$ ..... [3]

Changing the subject when it appears twice Click for more variations

3	$p = \dfrac{c}{a - x}$	**3**	**M1** one correct move **M1** second correct move **M1** third correct move marked on answer line

4 Make p the subject of the formula.

$$rp + 5 = 3p + 8r$$

$p =$ ..... [3]

Changing the subject when it appears twice Click for more variations

4	$p = \dfrac{8r - 5}{r - 3}$ oe final answer	**3**	**M1** for correctly collecting terms in p on one side and terms not in p on the other side **M1** for correct factorising **M1** for correct division dependent on p appearing only once in a factorised expression Maximum M2 for an incorrect final answer

5 Make x the subject of the formula.

$$P = \frac{x + 3}{x}$$

Answer $x =$ [4]

Changing the subject when it appears twice Click for more variations

5	$x = \dfrac{3}{P - 1}$	4	**M1** for each of the four moves completed correctly

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6 Make h the subject of the formula $2mh = g(1-h)$.

$h =$ ..... [4]

Changing the subject when it appears twice Click for more variations

6	$\frac{g}{2m+g}$ final answer	**4**	**M1** for expanding brackets or $\div g$ **M1** for isolating terms in h **M1** for factorising **M1** for dividing by bracket to isolate h Incorrect/unsimplified final answer scores max 3 marks

7 Make m the subject of the formula.

$$x = \frac{3m}{2-m}$$

$m =$ ..... [4]

Changing the subject when it appears twice Click for more variations

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7	$\frac{2x}{3+x}$ oe final answer	**4**	**M1** for correctly clearing the denominator and expanding bracket **M1** for correctly collecting terms in m on one side and terms not in m on the other **M1** for correct factorising **M1** for correct division dependent on m appearing only once in a factorised expression

8 Rearrange the formula to make m the subject.

$$R = \frac{2(m-k)}{m}$$

$m =$ ..... [4]

Changing the subject when it appears twice Click for more variations

8	$m = \frac{2k}{(2-R)}$ or $m = \frac{-2k}{(R-2)}$ final answer	**4**	**M1** for clearing fractions **M1** for expanding brackets (or ÷ 2) **M1** for collecting terms in m on one side and terms not in m on the other **M1** for dividing by a bracket maximum of **3** if final answer incorrect

9 Make x the subject of $3m + xy = \frac{xp}{4}$.

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$x =$ ..... [4]

Changing the subject when it appears twice Click for more variations

9	$\frac{12m}{p-4y}$ or $\frac{-12m}{4y-p}$ final answer	**4**	**M1** for $12m + 4xy = xp$ or $3m = \frac{xp}{4} - xy$ **M1** for $12m = xp - 4xy$ or $3m = x(\frac{p}{4} - y)$ **M1** for $12m = x(p-4y)$ or $\frac{3m}{\frac{p}{4} - y} = x$ **M1** for $\frac{12m}{p-4y}$ To a maximum of 3 marks for an incorrect answer

10 Make t the subject of the formula.

$$2 = \frac{m(1-t)}{pt}$$

$t =$ ..... [4]

Changing the subject when it appears twice Click for more variations

10	$[t =]\frac{m}{2p+m}$ final answer	**4**	**M1** for correctly clearing *their* fraction **M1** for correct expansion **M1** for correctly collecting *their* terms in t on one side and other terms on the other side, not dividing by $1 - t$ **M1** for correct factorisation and division of *their* two-term expression in t To a maximum of 3 marks for an incorrect answer

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