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

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Expressions, brackets and simplifying

Time allowed: 35 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

/ 28

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 28 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 **(a)** A ticket costs \$18.

Write down an expression, in dollars, for the cost of t tickets.

\$ ..... [1]

(b) A bag contains n red balls and 16 green balls.

Write down an expression for the total number of balls in the bag.

..... [1]

(a) Algebraic notation (b) Algebraic notation Click for more variations

1(a)	$18t$ final answer	**1**	
1(b)	$n + 16$ final answer	**1**	

2 Find the value of $7x + 3y$ when $x = 12$ and $y = -6$.

..... [2]

Substitution Click for more variations

2	66	**2**	**B1** for 84 or −18 seen

3 Expand the brackets and simplify.

$$7(2x+3y)-x(14-y)$$

..... [2]

Expanding and simplifying single brackets Click for more variations

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3	$21y + xy$ or $y(21 + x)$ final answer	**2**	**B1** for $14x + 21y$ or $-14x + xy$ or answer of $ky + xy$

4 Expand and simplify.

$$(x-4)(x-7)$$

..... [2]

Expanding double brackets Click for more variations

4	$x^2-11x+28$ final answer	**2**	**B1** for $x^2-4x-7x+28$ with at least 3 terms correct

5



NOT TO SCALE

The diagram shows a rectangle with length $3x-12$ and width $x+7$.

Find an expression for the perimeter of the rectangle.
Give your answer in its simplest form.

..... [3]

Collecting like terms Click for more variations

5	$8x-10$ or $2(4x-5)$ final answer	**3**	**B2** for $8x-10$ seen and spoilt or **M2** for $2(x+7)+2(3x-12)$ oe or **M1** for $x+7+3x-12$ oe or **B1** for $8x$ or -10 in final answer

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6 **(a)** $T = 3(5P - 8) + 4$

Find the value of T when $P = 12$.

$T =$ ..... [2]

(b) $W = 4t + 8$

Find the value of t when $W = 369$.

$t =$ ..... [2]

(a) Substitution (b) Substitution Click for more variations

6(a)	160	**2**	**M1** for $3(5\times12 - 8) + 4$ oe or better
6(b)	90.25	**2**	**M1** for $369 - 8 = 4t$ oe or better or $\frac{369}{4} = t + \frac{8}{4}$ oe or better or $\frac{W-8}{4}$ [$= t$] oe or better

7 Expand and simplify.

$$(x+1)(x+2) + 2x(x-3)$$

..... [3]

Expanding double brackets Click for more variations

7	$3x^2 - 3x + 2$ final answer	**3**	**B2** for $x^2 + 2x + x + 2 + 2x^2 - 6x$ oe or **B1** for 3 correct terms of $x^2 + 2x + x + 2$ oe

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8 Expand and simplify.

(a) $7(x+2)+4(3x-5)$

..... [2]

(b) $(3x-y)(5x+2y)$

..... [2]

(a) Expanding and simplifying single brackets (b) Expanding double brackets Click for more variations

8(a)	$19x - 6$ final answer	**2**	**B1** for $7x + 14$ or $12x - 20$ or for $19x - 6$ seen then spoilt
8(b)	$15x^2 + xy - 2y^2$ final answer	**2**	**B1** for $15x^2 + 6xy - 5xy - 2y^2$ with at least three terms correct

9 Expand and simplify.

$$(x-2)(2x+5)(x+3)$$

..... [3]

Expanding triple brackets Click for more variations

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9	$2x^3 + 7x^2 - 7x - 30$ final answer	**3**	**B2** for unsimplified expansion with at most one error or for simplified four-term expression of correct form with three terms correct or **B1** for correct expansion of two brackets with at least three terms out of four correct

10 $(x+a)(x+2)(2x+3)$ is equivalent to $2x^3 + bx^2 + cx - 18$.

Find the value of each of a, b and c.

$a =$ .....

$b =$ .....

$c =$ ..... [3]

Expanding triple brackets Click for more variations

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10	$[a =] -3$ $[b =] 1$ $[c =] -15$	**3**	**B1** for $a = -3$ **B1FT** for $b = 7 + 2 \times$ *their a* **B1FT** for $c = 6 + 7 \times$ *their a* If B0 scored **B1** for correct expansion of a pair of brackets or of three brackets $\left(x^2 + ax + 2x + 2a\right)\left[2x + 3\right]$ or $\left[x + a\right]\left(2x^2 + 4x + 3x + 6\right)$ or $2x^3 + \left(2a + 7\right)x^2 + \left(7a + 6\right)x + 6a$ oe or for $b = 7 + 2a$ or for $c = 6 + 7a$

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