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

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Completing the square

Time allowed: 40 minutes

Subject code **0580**

Mathematics

Questions from Paper 2 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

/ 30

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 8 questions worth 30 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 $x^2 - 16x + a$ can be written in the form $(x+b)^2$.

Find the value of a and the value of b.

$a =$ .....

$b =$ ..... [2]

Completing the square Click for more variations

2 Write $x^2 + 8x - 7$ in the form $(x+a)^2 + b$.

..... [2]

Completing the square Click for more variations

3 $(x-5)^2 + k = x^2 - px - 21$

Find the value of p and the value of k.

$p =$ .....

$k =$ .....

[2]

Completing the square Click for more variations

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4 $y = x^2 + 7x - 5$ can be written in the form $y = (x + a)^2 + b$.

Find the value of a and the value of b.

$a =$ .....

$b =$ ..... [3]

Completing the square Click for more variations

5 $2x^2 + 12x - 2$ can be written in the form $a(x + b)^2 - c$.

Find the values of a, b and c.

$a =$ ..... , $b =$ ..... , $c =$ ..... [3]

Completing the square Click for more variations

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6 $x^2 + 8x + 10 = (x+p)^2 + q$

(a) Find the value of p and the value of q.

$p =$ .....

$q =$ ..... [2]

(b) Solve.

$x^2 + 8x + 10 = 30$

$x =$ ..... or $x =$ ..... [2]

(a) Completing the square (b) Solving by completing the square Click for more variations

7 **(a)** Write $x^2 - 18x - 27$ in the form $(x+k)^2 + h$.

..... [2]

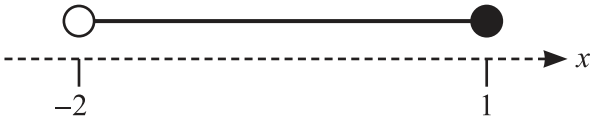
(b) Use your answer to **part (a)** to solve the equation $x^2 - 18x - 27 = 0$.

$x =$ ..... or $x =$ ..... [2]

(a) Completing the square (b) Solving by completing the square Click for more variations

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8 (a)



Write down the inequality in x shown by the number line.

..... [2]

(b) (i) Write x^2+4x+1 in the form $(x+p)^2+q$.

..... [2]

(ii) Use your answer to **part (b)(i)** to solve the equation $x^2+4x+1=0$.

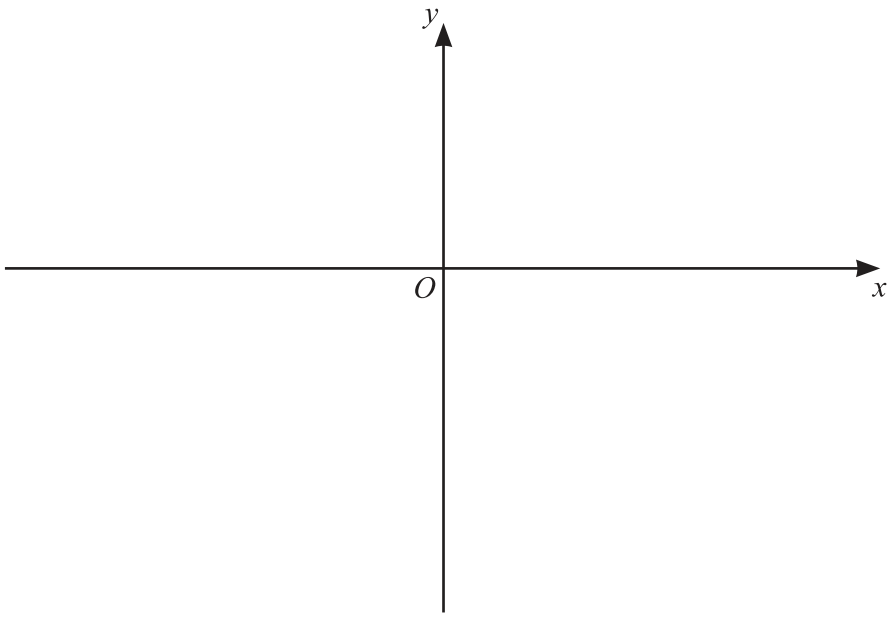
$x =$ ..... or $x =$ ..... [2]

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(iii) Use your answer to **part (b)(i)** to write down the coordinates of the minimum point on the graph of $y = x^2 + 4x + 1$.

(..... , ...) [2]

(iv) On the diagram, sketch the graph of $y = x^2 + 4x + 1$.



[2]

(a) Solving linear inequalities (b)(i) Completing the square (b)(ii) Solving by completing the square (b)(iii) Completing the square (b)(iv) Sketching graphs Click for more variations

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