Exercise 1

Paper 1 style · No calculator

1 6 marks SL 2.6 ●○○ Routine

Let $f(x) = -x^2 + 4x + 5$.

(a) Write $f(x)$ in the form $-(x-h)^2 + k$. **[2]**

(b) Write down the coordinates of the vertex of the graph of f. **[1]**

(c) Find the zeros of f. **[2]**

(d) Write down the range of f. **[1]**

The markscheme is on the next page: try the question first. Written and verified by a practising IB mathematics teacher, produced with AI assistance; solved twice and recomputed by software. Not affiliated with or endorsed by the International Baccalaureate Organization.
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MARKSCHEME (a)

$-\left(x^2 - 4x\right) + 5 = -\left[(x-2)^2 - 4\right] + 5$ **(M1)**

$-(x-2)^2 + 9$ **A1**

Total 2 marks

MARKSCHEME (b)

$(2,\ 9)$ **A1**

Total 1 mark

MARKSCHEME (c)

$-(x-5)(x+1) = 0$ **(M1)**

$x = -1,\ x = 5$ **A1**

Total 2 marks

MARKSCHEME (d)

$f(x) \leq 9$ **A1**

Total 1 mark