Exercise 2

Paper 1 style · No calculator

2 7 marks AHL 2.16 ●●○ Typical

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

(a) Find the x-intercepts of the graph of $y = f(x)$, and the coordinates of its vertex. **[2]**

(b) Hence write down the coordinates of the local maximum point of the graph of $y = |f(x)|$. **[1]**

(c) Solve the equation $|f(x)| = 5$. **[4]**

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.
© 2026 Hence

Exercise 2 — markscheme

Paper 1 style · No calculator

2 7 marks AHL 2.16 ●●○ Typical

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

(a) Find the x-intercepts of the graph of $y = f(x)$, and the coordinates of its vertex. **[2]**

(b) Hence write down the coordinates of the local maximum point of the graph of $y = |f(x)|$. **[1]**

(c) Solve the equation $|f(x)| = 5$. **[4]**

MARKSCHEME (a)

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

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

Total 2 marks

MARKSCHEME (b)

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

Total 1 mark

MARKSCHEME (c)

$f(x) = 5$ or $f(x) = -5$ **M1**

$x^2 - 4x - 10 = 0$: $x = 2 \pm \sqrt{14}$ **A1**

$x^2 - 4x = 0$: $x = 0,\ x = 4$ **A1**

four solutions: $2 - \sqrt{14},\ 0,\ 4,\ 2 + \sqrt{14}$ **A1**

Total 4 marks