# Exercise 3

Paper 2 style · Graphic display calculator

## 3 6 marks AHL 2.16 ●●● Demanding

Consider the graphs of $y = |x^2 - 9|$ and $y = x + 4$.

**(a)** Find the $x$-coordinates of the points of intersection of the two graphs. **[2]**

**(b)** Hence solve the inequality $|x^2 - 9| \geq x + 4$. **[2]**

**(c)** Find the exact value of the largest $x$-coordinate in part (a). **[2]**

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**(c)** Find the exact value of the largest $x$-coordinate in part (a). **[2]**

**MARKSCHEME (a)**

$-3.14,\ -2.79,\ 1.79,\ 4.14$ **A2**

**Total 2 marks**

**Note** A1 for two or three correct values.

**MARKSCHEME (b)**

$x \leq -3.14,\ -2.79 \leq x \leq 1.79,\ x \geq 4.14$ **A2**

**Total 2 marks**

**Note** A1 for two of the three intervals.

**MARKSCHEME (c)**

$x^2 - 9 = x + 4,\ x^2 - x - 13 = 0$ **M1**

$x = \dfrac{1 + \sqrt{53}}{2}$ **A1**

**Total 2 marks**

**Note** For $x > 3$ the modulus is $x^2 - 9$ itself.