Monic and non-monic factorisation

6 questions | 16 marks

Equivalent correct methods earn the corresponding marks.

1. Factorise $x^2 + 9x + 20$. [2 marks]

$4 \times 5 = 20$ and $4 + 5 = 9$.

Answer: $(x + 4)(x + 5)$

2. Factorise $x^2 - 2x - 15$. [2 marks]

$-5 \times 3 = -15$ and $-5 + 3 = -2$.

Answer: $(x - 5)(x + 3)$

3. Factorise $2x^2 + 7x + 3$. [3 marks]

Split $7x$ as $6x + x$: $2x(x + 3) + (x + 3)$.

Answer: $(2x + 1)(x + 3)$

4. Factorise $3x^2 - 11x - 4$. [3 marks]

Split $-11x$ as $x - 12x$: $x(3x + 1) - 4(3x + 1)$.

Answer: $(3x + 1)(x - 4)$

5. Factorise $2x^2 - 18$ completely. [3 marks]

First remove 2: $2(x^2 - 9)$.

Then use the difference of two squares.

Answer: $2(x - 3)(x + 3)$

6. Can $x^2 + x + 1$ be written as $(x + p)(x + q)$ with integer p and q? Explain. [3 marks]

The integer factor pairs of 1 are $(1, 1)$ and $(-1, -1)$. Their sums are 2 and -2, not 1.

Answer: No integer factorisation.