Cubic factors and roots

6 questions | 16 marks

Equivalent correct methods earn the corresponding marks.

1. Show $x-2$ divides x^3-4x^2+x+6. [2 marks]

Substitute: $8-16+2+6=0$.

Answer: $f(2)=0$.

2. Divide x^3-4x^2+x+6 by $x-2$. [3 marks]

Divide term by term.

Expand $(x-2)(x^2-2x-3)$ to check.

Answer: x^2-2x-3

3. Solve $x^3-4x^2+x+6=0$. [3 marks]

Use $(x-2)(x^2-2x-3)$.

Factor the quotient as $(x-3)(x+1)$.

Answer: $x=-1,2,3$

4. Find k when $x+2$ divides x^3+kx+6. [2 marks]

Set $f(-2)=-8-2k+6=0$.

Solve $-2k=2$.

Answer: $k=-1$

5. Factorise $x^3+2x^2-9x-18$. [3 marks]

Group $x^2(x+2)-9(x+2)$.

Factor difference of squares.

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

6. Solve $x^3-3x+2=0$, stating repeated roots. [3 marks]

Test $x=1$ and divide to obtain x^2+x-2.

The factorisation is $(x+2)(x-1)^2$.

Answer: $x=-2$; $x=1$ repeated.