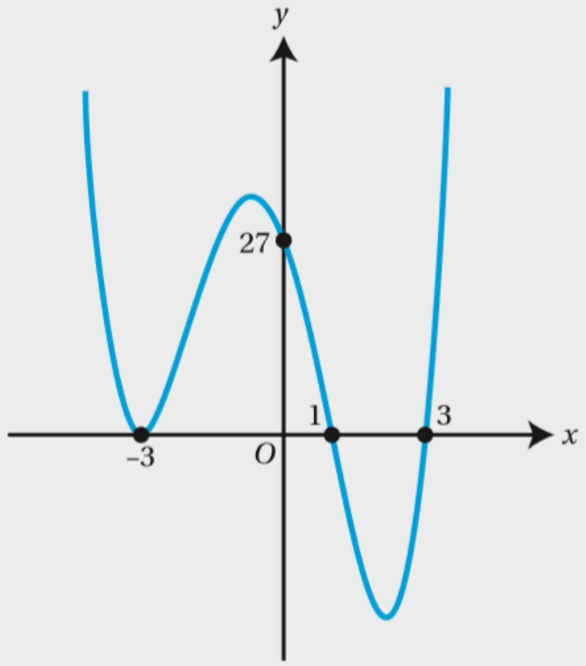
Mixed practice 4

1. The diagram shows the graph with equation $y = ax^4 + bx^3 + cx^2 + dx + e$. Find the values of a, b, c, d and e.



2. Show that

$$\frac{x^3 + 2x^2 - 3x - 6}{x + 2} = x^2 + bx + c$$

where b and c are integers to be found.

3. **a** Show that $(x - 2)$ is a factor of $f(x) = x^3 - 4x^2 + x + 6$.

   b Factorise $f(x)$.

   c Sketch the graph of $y = f(x)$.

4. Two cubic polynomials are defined by $f(x) = x^3 + (a - 3)x + 2b$, $g(x) = 3x^3 + x^2 + 5ax + 4b$, where a and b are constants.

   i Given that $f(x)$ and $g(x)$ have a common factor of $(x - 2)$, show that $a = -4$ and find the value of b.

   ii Using these values of a and b, factorise $f(x)$ fully. Hence show that $f(x)$ and $g(x)$ have two common factors.

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5. **a** Given that $(2x - 1)$ and $(x + 2)$ are factors of $2x^3 + ax^2 + 4x + b$, find the values of a and b.

   b Hence sketch the graph of $y = 2x^3 + ax^2 + 4x + b$.

6 Sketch the graph of $y=(x-a)^2(x-b)(x-c)$ where $b<0<a<c$.

7 The cubic polynomial f(x) is defined by $f(x)=x^3+x^2-11x+10$.

i Use the factor theorem to find a factor of f(x).

ii Hence solve the equation $f(x)=0$, giving each root in an exact form.

8 The polynomial x^2-4x+3 is a factor of the polynomial $x^3+ax^2+27x+b$. Find the values of a and b.

Mixed practice 4

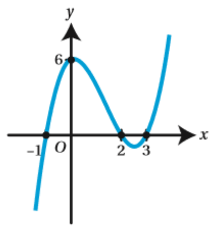
1 $a=1, b=2, c=-12, d=-18, e=27$

2 $b=0, c=-3$

3 a $f(2)=0$

b $f(x)=(x-2)(x+1)(x-3)$

c

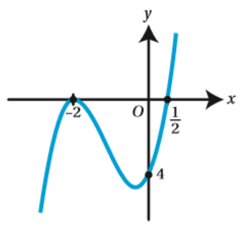


4 a $b=3$

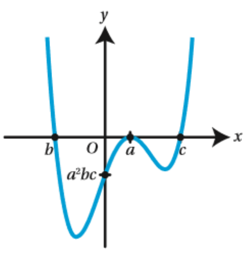
b $f(x)=(x-2)(x+3)(x-1)$ $(x+3)$ is also a factor of g(x).

5 a $a=7, b=-4$

b



6



7 a $(x-2)$ **b** $2, \frac{-3\pm\sqrt{29}}{2}$

8 $a=-10, b=-18$