Section 2: The chain rule

Exercise level 3 (Extension)

1. The curve $y = (ax + b)^3$ passes through the point (0, 8) and has gradient 60 there. Find the values of *a* and *b*.

2. (i) Use the chain rule to find the coordinates of the stationary point of the curve $y = \left(\frac{x+1}{x}\right)^4$ Hint: rewrite the expression in the bracket in a suitable form.

   (ii) Repeat (i) for the curve $y = x\sqrt{x+1}$. Hint: use $x = \sqrt{x^2}$.

3. (i) Describe the transformations mapping $y = x^4$ to $y = 2(x-1)^4$.

   (ii) The point P is transformed to point P′ (3, 32). Find the coordinates of P.

   (iii) Hence find the gradient of the transformed curve at point P′.

   (iv) Verify this by directly differentiating the transformed curve using the chain rule.