Section 1: Introduction to integration

Exercise level 3 (Extension)

1. For each of the following gradient functions, find the equation of the graph through the point given:

   (i) $\frac{dy}{dx} = (x-2)(x+5)$ through (0, 3).

   (ii) $\frac{dy}{dx} = (x-2)(x+5)$ through (1, -2).

   Make a comment on the relationship between the curves in (i) and (ii).

2. Two graphs have gradient functions $\frac{dy}{dx} = 3x^2 + 3x + a$ and $\frac{dy}{dx} = 3x^2 - 2x + 1$. The graphs cross at the point (1, a) and also at the point where x = -2.
   Find the equations of the two graphs, and the value of a.

3. A cubic graph has turning points at (2, 1) and (-1, -2). Find the equation of the graph.