

**Self-assessment: 19 Further integration methods**

1. Use the substitution  $u = x - 1$  to find  $\int x^2 \sqrt{x-1} \, dx$ .

*(accessible to students on the path to grade 3 or 4) [5 marks]*

2. Find  $\int x e^{-3x} \, dx$ .

*(accessible to students on the path to grade 3 or 4) [5 marks]*

3. Find the exact value of  $m$  such that  $\int_0^m \frac{dx}{1+2x} = 3$ .

*(accessible to students on the path to grade 3 or 4) [5 marks]*

**4. Do not use a calculator to answer this question.**

Evaluate  $\int_{-3}^{-4} \frac{1}{x^2 + 6x + 10} \, dx$ .

*(accessible to students on the path to grade 5 or 6) [6 marks]*

**5. Do not use a calculator to answer this question.**

(a) Show that  $\int \tan x \, dx = \ln |\sec x| + c$ .

(b) Find the exact value of  $\int_0^{\pi/3} \tan^3 x \, dx$ .

*(accessible to students on the path to grade 7) [9 marks]*