**Self-assessment: 3 Algebraic structures**

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

Solve the equation *x*4 – 5*x*2 + 4 = 0.

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

**2.** Solve the equation 2e2*x* = *x* + 3.

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

**3.** Sketch the graph of , indicating clearly the equations of any asymptotes and maximum or minimum points.

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

**4.** Find the exact solution of the equation e2*x* + 2e*x* = 15.

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

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

(a) Sketch the graph of *y* = ln *x*

*(accessible to students on the path to grade 3 or 4)*

(b) Show that log3(9*x*2) – log3(6*x*) = log3 *x* – log32 + 1.

(c) Hence solve the equation log3(9*x*2) – log3(6*x*) = 2*x* log3 *x* – log32 + 1.

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

*[12 marks]*