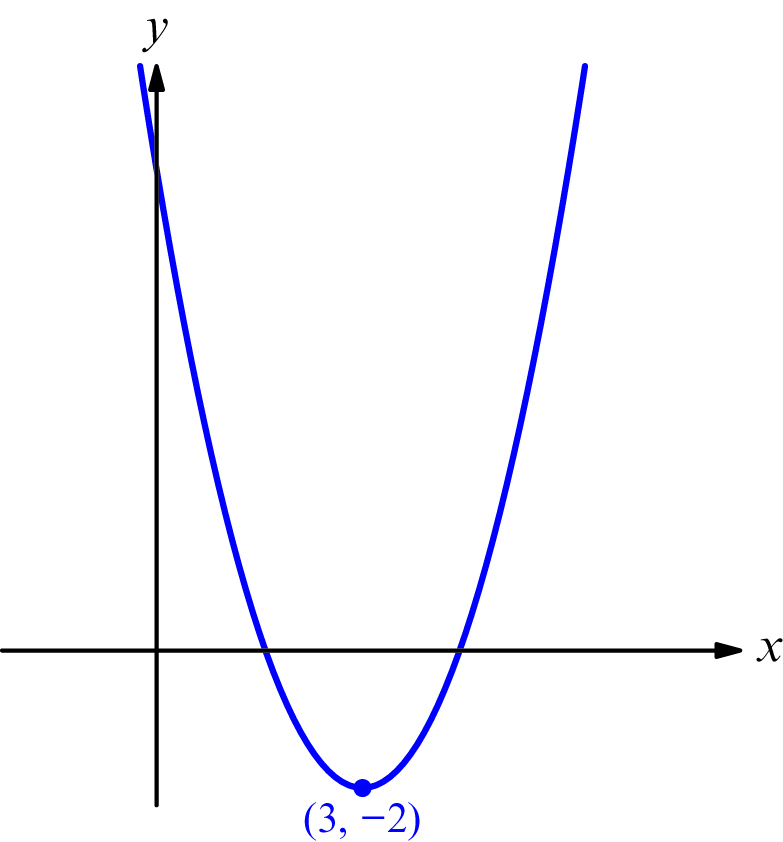
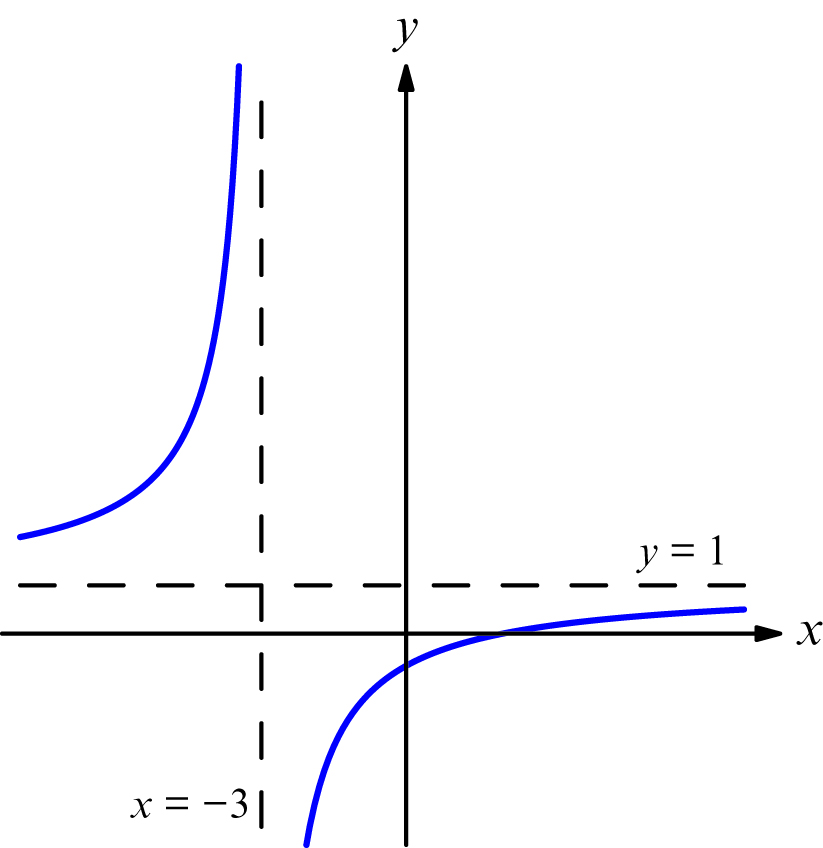
**Self-assessment: 4 The theory of functions**

**1.** Write down the domain and range for the functions represented by the following graphs:

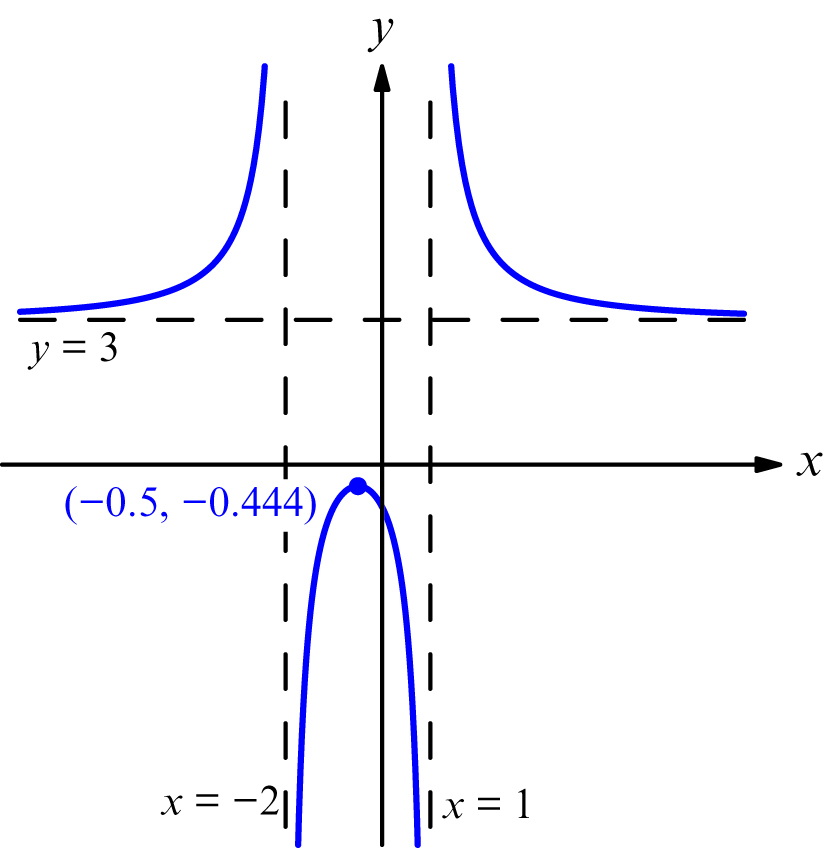
(a)



(b)



(c)



*[7 marks]*

**2.** A function is given by **. Find an expression for .

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

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

Given that *f*(*x*) = 2*x*2 − 11 and *g*(*x*) = *x* + 2, solve the equation *fg*(*x*) = 2*x*.

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

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

A function is defined by .

(a) State, in terms of *a* and *b*,

(i) The *x*- and *y*-intercepts of *y* = *f*(*x*).

(ii) The equations of the asymptotes of the graph *y* = *f*(*x*).

(iii) The range of *f*(*x*).

(b) Solve the equation *f*(*x*) = 2.

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

(c) Find an expression for *f* −1(*x*) and state its domain.

(d)Find the value of *b* for which *f*(*x*) is a self-inverse function.

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

*[15 marks]*