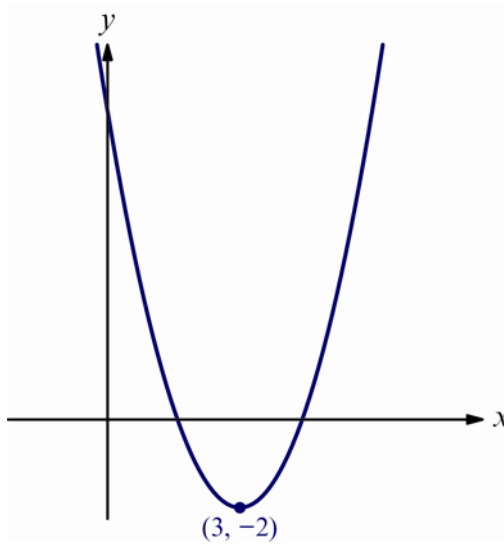


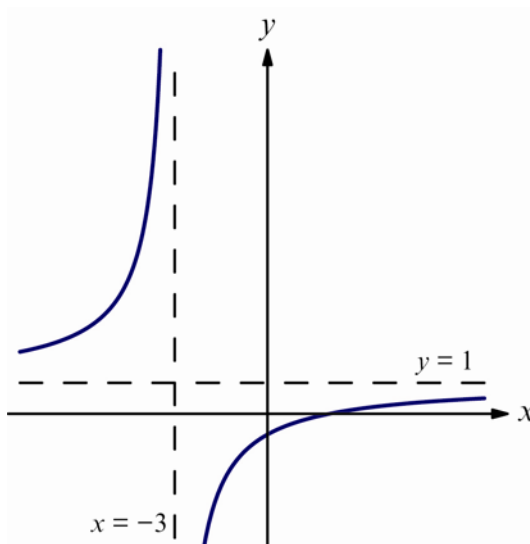
Self-assessment: 4 The theory of functions

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

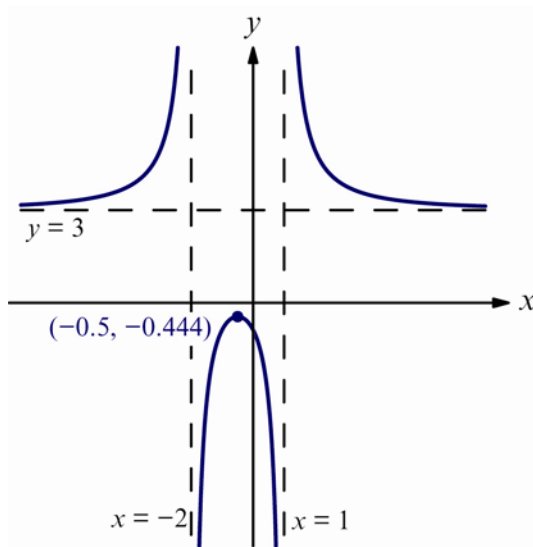
(a)



(b)



(c)



[7 marks]

2. A function is given by $f : x \mapsto \ln(3x - 2)$, $x > \frac{2}{3}$. Find an expression for $f^{-1}(x)$.

(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 $f(x) = 2x^2 - 11$ and $g(x) = x + 2$, solve the equation $fg(x) = 2x$.

(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 $f(x) = \frac{3x - a}{x - b}$.

- (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]