

5.

$$f(x) = 2x^2 + 4x + 9 \quad x \in \mathbb{R}$$

(a) Write  $f(x)$  in the form  $a(x + b)^2 + c$ , where  $a$ ,  $b$  and  $c$  are integers to be found.

(3)

(b) Sketch the curve with equation  $y = f(x)$  showing any points of intersection with the coordinate axes and the coordinates of any turning point.

(3)

(c) (i) Describe fully the transformation that maps the curve with equation  $y = f(x)$  onto the curve with equation  $y = g(x)$  where

$$g(x) = 2(x - 2)^2 + 4x - 3 \quad x \in \mathbb{R}$$

(ii) Find the range of the function

$$h(x) = \frac{21}{2x^2 + 4x + 9} \quad x \in \mathbb{R}$$

(4)