

**10.** The function  $f$  is defined by

$$f : x \mapsto \frac{3x-5}{x+1}, \quad x \in \mathbb{R}, \quad x \neq -1.$$

(a) Find  $f^{-1}(x)$ .

**(3)**

(b) Show that

$$ff(x) = \frac{x+a}{x-1} \quad x \in \mathbb{R}, \quad x \neq -1,$$

where  $a$  is an integer to be found.

**(4)**

The function  $g$  is defined by

$$g : x \mapsto x^2 - 3x, \quad x \in \mathbb{R}, \quad 0 \leq x \leq 5.$$

(c) Find the value of  $fg(2)$ .

**(2)**

(d) Find the range of  $g$ .

**(3)**

(e) Explain why the function  $g$  does not have an inverse.

**(1)**

**(Total for Question 10 is 13 marks)**