8 The equation of the straight line **L** is $y = 2 - 3x$

(a) Find the exact coordinates of the points where **L** crosses the coordinate axes.

(2)

The functions f and g are defined as

$$f : x \mapsto 2 - 3x$$

$$g : x \mapsto \frac{3 + x}{1 - 2x} \qquad x \neq \frac{1}{2}$$

(b) Find $g(-2)$

(1)

(c) Find the values of x for which $ff(x) + g(x) = 0$
Show your working clearly and give your answer in the form

$$\frac{a \pm \sqrt{b}}{c}$$

where a, b and c are integers.

(5)

(d) Express the inverse of the composite function fg in the form $(fg)^{-1} : x \mapsto ...$

(5)

[Solutions of $ax^2 + bx + c = 0$ are $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$]

Question 8 continued

Question 8 continued

Question 8 continued

(Total for Question 8 is 13 marks)