

11 The three functions,  $f$ ,  $g$  and  $h$ , are defined as

$$f : x \mapsto 4x^3 + 4x^2 - 5x - 3$$

$$g : x \mapsto \frac{x-7}{3-2x}$$

$$h : x \mapsto 2x + 1$$

- (a) Write down the value of  $x$  that must be excluded from any domain of  $g$  (1)
- (b) Find  $g(2)$  (1)
- (c) Express the inverse function  $g^{-1}$  in the form  $g^{-1}(x) = \dots$  (3)
- (d) Solve the equation  $g(x) = h(x)$  (4)
- (e) (i) Use the factor theorem to show that  $(2x + 3)$  is a factor of  $f(x)$  (2)
- (ii) Hence solve the equation  $f(x) = 0$   
Show clear algebraic working. (4)

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**TOTAL FOR PAPER IS 100 MARKS**

