

8.

$$f(x) = \ln(2x - 5) + 2x^2 - 30, \quad x > 2.5$$

(a) Show that  $f(x) = 0$  has a root  $\alpha$  in the interval  $[3.5, 4]$

(2)

A student takes 4 as the first approximation to  $\alpha$ .

Given  $f(4) = 3.099$  and  $f'(4) = 16.67$  to 4 significant figures,

(b) apply the Newton-Raphson procedure once to obtain a second approximation for  $\alpha$ , giving your answer to 3 significant figures.

(2)

(c) Show that  $\alpha$  is the only root of  $f(x) = 0$

(2)