1. $$f(x) = 3\sqrt{x} - \frac{1}{x} - 5 \qquad x > 0$$

The equation $f(x) = 0$ has a root α in the interval [3, 3.8]

(a) Starting with the end points of this interval, use interval bisection to determine α to one decimal place.

(4)

(b) (i) Determine $f'(x)$

(2)

(ii) Using your answer to part (a) as a first approximation to α, apply the Newton-Raphson process once to calculate a further approximation for α, giving your answer to 4 decimal places.

(2)

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Question 1 continued

(Total for Question 1 is 8 marks)