

- 3. In this question you must show all stages of your working.
Solutions relying entirely on calculator technology are not acceptable.**

$$f(x) = 3x^3 - 20x^2 + 45x - 22$$

(a) Use the factor theorem to show that $(3x - 2)$ is a factor of $f(x)$ (2)

(b) Hence show that the equation $f(x) = 0$ has only one real root. (4)

(c) Hence find the exact value of x for which

$$3(\ln 2x)^3 - 20(\ln 2x)^2 + 45 \ln 2x - 22 = 0$$
(2)