ECO137 Homework Questions for Chapter 7 'Derivatives in Use' Part 2

1. Show that each of the following equations has at least one root in the given interval.

(a) $x^7 - 5x^5 + x^3 - 1 = 0$ in $(-1,1)$, (b) $\sqrt{x^2 + 1} = 3x$ in $(0,1)$, (c) $e^{x-1} = 2x$ in $(0,1)$

2. The equation $x^4 + 3x^3 - 3x^2 - 8x + 3 = 0$ has an integer root. Find it. The three additional roots are close to -1.9, 0.4 and 1.5. Find a better approximation to each of these roots by using Newton's method once.

3. The equation $x^3 - x - 5 = 0$ has a root close to 2. Find an approximation by using Newton's method once, with x0=2.

4. Find the following limits:

(a) $\lim\limits_{x \to -2} \dfrac{x^3 + 3x^2 - 4}{x^3 + 5x^2 + 8x + 4}$, (b) $\lim\limits_{x \to 0} \dfrac{2\sqrt{1+x} - 2 - x}{2\sqrt{1+x+x^2} - 2 - x}$