Problem 2. 2013.1.1

(i) Use the substitution $\sqrt{x} = y$ (where $y \geq 0$) to find the real root of the equation

$$x + 3\sqrt{x} - \tfrac{1}{2} = 0.$$

(ii) Find all real roots of the following equations:

(a) $x + 10\sqrt{x+2} - 22 = 0$;

(b) $x^2 - 4x + \sqrt{2x^2 - 8x - 3} - 9 = 0$

Pre-requisites.

You will need to have a decent standard of GCSE algebra.

First Thoughts.

This looks easy. I'll use the substitution, see where it leads and explore the rest of the question after that.