(1) Prove that $\sqrt{2} + \sqrt[3]{2}$ is irrational.
(2) Show that the equation

$$3x^3 + 2x^2 - 5x - 2 = 0$$

has no rational solutions.
(3) Let n be an integer which is not a complete square, i e there is no integer m such that $m^2 = n$.

Prove that $\sqrt{n}$ is irrational.
(4) Let $x = q_1\sqrt{2} + q_2\sqrt{3}$ where q_1, q_2 are rational. Prove that x is rational if and only if $q_1 = q_2 = 0$.
(5) Find $\sqrt{5}$ up to 2 decimal points without using a calculator.
(6) Show that there is a polynomial with integer coefficients which has $\sqrt{2} + \sqrt{3} + \sqrt{5}$ as a root.