Proof

Prove that $\dfrac{1+x}{1+\sqrt{2}} \equiv x\sqrt{2} + \sqrt{2} - x - 1$.

Use completing the square to prove that $n^2 - 10n + 40$ is positive for all values of n.

Show that $(x-3)$ is a factor of $f(x) = x^3 - 4x^2 + x + 6$.