(b) $\sqrt{n} \notin \mathbb{Q}$ if n is not a perfect square (HINT: write $n = k^2 r$, where r does not contain any square factor),

If n is not a perfect square, then at least one of its factors is not a square. So we can write $n = k^2 r$ where r does not contain any square factors.

Now, we argue by contradiction. Suppose that n is not a perfect square and $\sqrt{n} \in \mathbb{Q}$.

Then we can write $\sqrt{n} = p/q$, $p, q \in \mathbb{N}$, where p and q have no common factors (p/q is in its simplest form).

Then $n = p^2/q^2 = k^2 r$ or, equivalently,

$r = p^2$. But this is imposible because