2.1) Show $\sqrt{3}, \sqrt{5}, \sqrt{7}, \sqrt{24}$, and $\sqrt{31}$ are not rational numbers.

Proof:

First, we will show that $\sqrt{3}$ is not a rational number. The only possible rational solutions of $x^2-3=0$ are $\pm 1, \pm 3$, and none of these numbers are solutions.

Next, we will show that $\sqrt{5}$ is not a rational number. The only possible rational solutions of $x^2-5=0$ are $\pm 1, \pm 5$, and none of these numbers are solutions.

Then, we will show that $\sqrt{7}$ is not a rational number. The only possible rational solutions of $x^2-7=0$ are $\pm 1, \pm 7$, and none of these numbers are solutions.

Lastly, we will show that $\sqrt{29}$ and $\sqrt{31}$ are not rational numbers.

Note that the only possible rational solutions of $x^2-29=0$ are $\pm 1, \pm 29$, and the only possible rational solutions of $x^2-31=0$ are $\pm 1, \pm 31$, but none of these numbers are solutions.

Therefore, $\sqrt{3}, \sqrt{5}, \sqrt{7}, \sqrt{29}$, and $\sqrt{31}$ are not rational numbers.