$$\sum u_n = \sum_{n=0}^{\infty} (-1)^{n-3} \cdot \frac{\sqrt{n}}{n+4}$$

$$= \sum_{n=0}^{\infty} (-1)^{n-3} \cdot \frac{1}{\sqrt{n}\left(1+\frac{4}{n}\right)}$$

$$= \sum (-1)^{n-3} \cdot b_n \quad \text{where } b_n = \frac{1}{\sqrt{n}\left(1+\frac{4}{n}\right)}$$

now (i)

$\because$ $\langle b_n \rangle$ is monotonically decreasing

0

$\because$ $b_n = \frac{\sqrt{n}}{n+4}$; $b_{n+1} = \frac{\sqrt{n+1}}{n+5}$

$$b_{n+1} - b_n = \frac{\sqrt{n+1}}{n+5} - \frac{\sqrt{n}}{n+4}$$

$$= \frac{(n+4)\sqrt{n+1} - (n+5)\sqrt{n}}{(n+5)(n+4)} \qquad \frac{n^{3/2} \leftarrow \text{term}}{n^2 \leftarrow \text{term}}$$

$$= < 0$$

$b_{n+1} < b_n \Rightarrow$ monotonic decreasing

(ii) $\lim_{n\to\infty} b_n = \lim_{n\to\infty} \frac{1}{\sqrt{n}\left(1+\frac{4}{n}\right)} = 0$

hence satisfied both condition of Leibnitz test

$\therefore$ series is convergent.