1. Determine whether the series \( \sum_{n=0}^{\infty} 3^{n+1}/4^n \) is convergent or divergent. If it is convergent, find its sum.

\[
\sum_{n=0}^{\infty} 3^{n+1}/4^n = 3 \sum_{n=0}^{\infty} \left(\frac{3}{4}\right)^n = \frac{3}{1 - \frac{3}{4}} = 12
\]

convergent \ (\text{geometric series with } r = \frac{3}{4})

2. Use \( p \)-series to determine whether the series \( \sum_{n=1}^{\infty} \frac{\sqrt{n} + 2}{n^2} \) is convergent or divergent.

\[
\sum_{n=1}^{\infty} \frac{\sqrt{n} + 2}{n^2} = \sum_{n=1}^{\infty} \frac{1}{n\sqrt{n}} + \sum_{n=1}^{\infty} \frac{2}{n^2} \ ; \ \text{since}
\]

both are \( p \)-series with \( p = \frac{3}{2} \) and \( p = 2 \), they are convergent. Hence \( \sum_{n=1}^{\infty} \frac{\sqrt{n} + 2}{n^2} \) is convergent