Homework 1

1. Prove that
$$\lim_{n\to\infty} \frac{2n^2+3}{n^2} = 2.$$

2. Guess the limit
$$\lim_{n\to\infty} \frac{n+3}{2n+1},$$
then prove it.

3. Guess the limit of the sequence $x_n = 1/2^n$, $n \geq 1$, then prove that this is true.

4. Prove that
$$\lim_{n\to\infty} \frac{n^2+n}{n^2} = 1.$$

5. Prove that
$$\lim_{n\to\infty} \sqrt{\frac{n+1}{4n}} = \frac{1}{2}.$$