

MAS114 Homework Problems

Week 10 (hand in in week 11)

1. Show that $\log_{10}(37)$ and $\sqrt[3]{2}$ are irrational numbers.
2. (a) Show directly from the definition of convergence that the sequence defined by

$$a_n = \frac{1 - \frac{1}{n}}{1 + \frac{1}{n}}$$

converges to 1.

- (b) Show directly from the definition of convergence that the sequence defined by

$$b_n = \frac{(2n+1)(2n-1)}{n^2}$$

converges to 4.

3. **Challenge:** Show that $\sqrt{3} + \sqrt{5} + \sqrt{7}$ is irrational.

[Please hand in attempts to the Challenge problem on a separate sheet of paper so they can make their way to Dr Cranch more easily.]