

MATH 347: FUNDAMENTAL MATHEMATICS, FALL 2015

HOMEWORK 3

Due on Wednesday, Sep 16

**Exercises from the textbook.** 2.3, 2.4, 2.23, 2.25, 2.37(e, f, g), 2.48, 2.51, 2.53

CLARIFICATION FOR 2.25: You have to find an example of a function  $f$  (nothing fancy), for which one of the statements holds and the other one does not.

**Out-of-the-textbook exercises** (these are as mandatory as the ones from the textbook).

1. Prove or find a counter-example:

(a)  $\forall$  (real)  $\varepsilon > 0 \exists N \in \mathbb{N} \forall n \geq N \frac{2^n}{2^{n+1}} < \varepsilon$ .

HINT: To simplify the fraction, add and subtract 1 to the numerator.

(b)  $\forall$  (real)  $\varepsilon > 0 \exists N \in \mathbb{N} \forall n \geq N \frac{1}{\sqrt{n}} < \varepsilon$ .