# MAT 125A HW 1

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1. §4.2

Exercise 4.2.1 We want to prove:

$$\lim_{x\to 2}(2x+4) = 8$$

*Proof.* Choose $\epsilon > 0$, we want to find $\delta > 0$ such that

$$0 < |x-2| < \delta \implies |(2x+4)-8| < \epsilon$$

.

We can simplify the consequent a bit.

$$\begin{aligned} |(2x+4)-8| &< \epsilon \\ |2x-4| &< \\ 2\,|x-2| &< \\ |x-2| &< \frac{\epsilon}{2} \end{aligned}$$

If we notice, this is exactly the form of the antecedent, assuming $\delta = \frac{\epsilon}{2}$.
So, choose $\delta = \frac{\epsilon}{2}$. Then we have

$$0 < |x-2| < \delta \implies |(2x+4)-8| < \epsilon$$

as was to be shown. □

Exercise 4.2.2

Exercise 4.2.3

Exercise 4.2.4

Exercise 4.2.6

Exercise 4.2.7

Exercise 4.2.8

Exercise 4.2.9