# Math 115A: Problem set 3

Sections 1 and 3. Instructor: James Freitag

Due 10/23

## Problem 1 Coordinates

Find an example of two ordered bases of $\mathbb{R}^2$, say $\alpha \neq \beta$ and a nonzero vector $v \in \mathbb{R}^2$ such that $[v]^\alpha = [v]^\beta$.

Given $\alpha$ and $\beta$, can you always find such a nonzero $v$?

Given $\alpha \neq \beta$, can you find two nonzero vectors $v, w$ such that $[v]^\alpha = [v]^\beta$ and $[w]^\alpha = [w]^\beta$? Can you find two nonzero linearly independent vectors $v, w$ such that $[v]^\alpha = [v]^\beta$ and $[w]^\alpha = [w]^\beta$?

## Problem 2 Exercises from the book

Do the following exercises from book:

- 1,2,15,37 from section 2.1.

- 2,8 from section 2.2.

- 1 from section 2.3.