

Homework 0: (do not turn in)

1. Page 5 (5): Which of the following collections of 3-vectors $[a, b, c]$ are vector spaces? Provide reasons.
 - (a) The vectors with $b = 0$.
 - (b) The vectors with $b = 1$.
 - (c) The vectors with $ab = 0$.
 - (d) All the linear combinations of the two vectors $[1, 1, 0]$ and $[2, 0, 1]$.
 - (e) All the vectors such that $c - a = 2b$.
2. Page 5 (6): Are the three vectors $[1, 2, 3]$, $[-2, 0, 1]$ and $[1, 10, 17]$ linear dependent or independent? Do they span all vectors or not?
3. Page 5 (7): Are the functions $1 + x$, $1 - x$ and $1 + x + x^2$ linear dependent or independent? Why?
4. Page 5 (8): Find a vector that, together with the vectors $[1, 1, 1]$ and $[1, 2, 1]$, forms a basis of \mathbb{R}^3 .
5. Page 5 (9): Show that the functions $(c_1 + c_2 \sin^2 x + c_3 \cos^2 x)$ form a vector space. Find a basis of it. What is its dimension?