# Excercises for Sect. 1.2

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## 2.

The constraints $a + b + c = \alpha$ and $x + x = 2x$ would require $2\alpha = \alpha$. The only way this can be valid is if $\alpha = 0$.

## 3.

$V = \mathbb{Z}^2, \mathbb{F} = \mathbb{R}$
Closed under addition and additive inverse. e.g. $(a, b) + (c, d) = (a + c, b + d)$ and $(a, b) + (a, b) = 0$ are valid for integers.
Not closed under scalar multiplication. e.g. $\sqrt{2}x$

## 4.

$V = \mathbb{R}^2, U = \{(a, b) : a = 0, b \neq 0 \text{ or } a \neq 0, b = 0\}$
Not closed under addition: e.g. (1,0) + (0,1) = (1,1)

## 8.

This is true. We are simply removing elements of the original spanning set of $P(\mathbb{R})^m$ which is still a subspace.
Ex: $1 + x^5$.