

Name:

1. (4 points) Consider the function  $m : \mathbb{R}^3 \rightarrow \mathbb{R}$  defined by

$$m(x) = \max(x_1, x_2, x_3).$$

Is  $m$  linear or not? If it is, find a vector  $c$  with  $m(x) = c^T x$  for all  $x$ . If it is not, find a specific example (similar to what you did on your homework) where superposition fails.

2. (4 points) Suppose  $f$  is linear and that we know:

$$f(1, 2, 2) = 5$$

$$f(2, 1, 1) = -3$$

Either compute  $f(5, 4, 4)$  (with justification) or explain why this cannot be done with the information given.