
None of the problems on this assignment are graded. Instead, after completing it, please fill out the associated Google form. That form is the only graded component.

Exercise 1. *Is the function $f(x) = 2x - 4$ a linear function? recall that for a linear function $f(ax_1 + bx_2) = af(x_1) + bf(x_2)$. The result may not be what you would expect.*

Exercise 2. *A complex number z may be represented as $z = x + yi$ where x and y are real numbers, and i is the imaginary unit defined by $i = \sqrt{-1}$. Show that the set of complex numbers is a vecor space.*

Exercise 3. *Consider vectors $|v_1\rangle = \begin{bmatrix}1\\1\end{bmatrix}$, $|v_2\rangle = \begin{bmatrix}-1\\1\end{bmatrix}$. Are they linearly dependant or independant, justify your answer.*

Exercise 4. *Show that the dot product on ordered pairs of numbers abides by all three criteria of being an inner product. These criteria are symmetry, linearity in the first slot, and positive semi-definiteness.*

Bonus

Exercise 5.

For the vector space of polynimials up to degree 4, write a set of basis vectors for this set. Remember, this must be a set of vectors for which any other polynimial of degree 4 may be created as a linear combination of these vectors. They must be be linearly independant, and minimally spanning (which means as few basis vectors as possible). Hint: this will be a set of 5 differnet polynomials.