Due date:
Friday, 3/12, **due 6pm, submit through Canvas**.

Instructions:
Students are encouraged to work together and discuss the homework problems, however each student must write up the solutions in their own words. Homework solutions should be well-explained, except True/False questions unless requested otherwise.

The format of HW is not restricted, but the PDF file is the preferred one.

Problem 1: Suppose A is a n-by-n matrix. Suppose that $\mathbf{x}$ is a vector in $\mathbb{R}^n$. We define $\|\mathbf{x}\|_2 = \sqrt{x_1^2 + \cdots + x_n^2}$, where $\mathbf{x} = (x_1, \cdots, x_n)$. Find the operator norm of $A = \begin{pmatrix} 1 & 0 \\ 0 & -5 \end{pmatrix}$. That is, find $\|A\|_2 = \max\{\|A\mathbf{u}\|_2 : \|\mathbf{u}\|_2 = 1\}$.

Problems in [1]:
Pages 141–142, problems 3.2.16, 3.2.17 (only do 3.2.16 for this weighted inner product), 3.2.27
Pages 147–148, problems 3.3.4
Pages 149–150, problems 3.3.20(a-d), 3.3.28(a-b)
Pages 155–155, problems 3.3.45(d)
Pages 159–161, problems 3.4.1(c,e), 3.4.6, 3.4.7(a)
Pages 165–166, problems 3.4.22(a,b) for (iv), 3.4.27

References

[1] Peter Olver and Chehrzad Shakiban, Applied Linear Algebra, 2nd Edition