MATH 350: Linear Algebra

Quiz 4

NAME: _____ Date: November 29, 2018

Solve the following problems on this sheet of paper. No calculators or other electronic devices are permitted. **There is a problem on the back!**

1. (3 points) Define $T : P(\mathbb{R}) \to P(\mathbb{R})$ by

$$T(f(x)) = xf(x).$$

Consider the subspace of $P(\mathbb{R})$

$$W = P_2(\mathbb{R}).$$

Is W T-invariant? Why or why not?

2. (3 points) Let $T = L_A$, where

$$A = \begin{pmatrix} -3 & -12 & -1 \\ 2 & 7 & 1 \\ 0 & 0 & 1 \end{pmatrix}.$$

Find an ordered basis for the T-cyclic subspace generated by e_2.

3. (4 points) Suppose that $A \in M_{3\times 3}(\mathbb{R})$ has characteristic polynomial

$$f_A(t) = 4 + 2t^2 - t^3.$$

Prove that A is invertible.