Math 225 Quiz 2

Don't forget to write down clearly your **Name**: and **Net ID:**

1. True or False (5 points) Mark "T" (True) or "F" (False) in front of each statement.

____ If $v \in V$ is a nonzero vector, then $T : V \longrightarrow V,\ u \mapsto u + v$ is a linear map.

____ If $T : U \longrightarrow V$ is linear, then T carries linearly independent subsets of U to linearly independent subsets of V.

____ If V has finite bases β and γ of n elements, then $[\mathrm{Id}_V]^{\gamma}_{\beta} = I_n$.

____ The matrix for the map $F : V \longrightarrow V, v \mapsto 0_V$ with respect to any bases of V is the zero matrix.

____ If V is finite-dimensional and a linear map $T : V \longrightarrow V$ is onto, then T is an isomorphism.

2. Basis and Matrix (5 points). Let P be the space of degree less than or equal to 2 polynomials $P = \{f(x) = a + bx + cx^2\}$. With respect to the basis $\beta = \{1, x, x^2\}$, compute the matrix $[T]_\beta$ for the linear map

$$T = \frac{d^2}{dx^2} + x\frac{d}{dx} : P \longrightarrow P.$$