**Quick answers (for Prove/Disprove)** (sent this morning)

**1a) True.** For a proof, see class notes (or office hours on Thursday)

**1b) True.** For a proof, see class notes (or office hours on Thursday)

**1c) True**. For a proof, see class notes (or office hours on Thursday)

**1d) False:** nullity (A-5I)=1, so we have 1 eigenvector. Or, use Math 220 theorem

**1e) True.** The n distinct eigenvalues yield n linearly indep. eigenvectors. Hence A is diagnalizable.

**1f) True.** For a proof, see class notes (or office hours on Thursday) or follow this Hint.

Hint: A500=0 implies 0 is the only eigenvalue. Now A=PDP-1= …..=0

**1g)True:**TakeA to be the diagonal (more than diagonalizable) matrix with diagonal entries{5, 5, 7, 7}.

**2a) False.** The best correction is

$Let T:V\rightarrow W$ be a linear transformation such that dimV=dim W= n. If T is 1-1 (or onto), then T is an isomorphism. **Proof of correction:** See class notes (via rank-nullity: dim null(T)+ dimT(V) = dimV)

**2b) True:** dimV=dim W= n implies V and W are isomorphic to Rn via …………………(see class notes)

**2c)** **False.** The best correction is

Any 1-1 linear transformation maps linearly independent vectors to linearly independent vectors.

**Proof of correction:** see class notes (or office hours on Thursday).

**2d)** **True:**

Hint: dim null(T)+ dimT(V) = dimV =3. So dim T(V) ≤ 3. Hence T(V) ≠ R5

**2e) True:**

Hint: det A ≠0. So A has an inverse. Hence T (given by T(x)=Ax) has an inverse, so T is an isomorphism

**2f) True**.

Hint: We gave 2 different proofs in class. Either by rank-nullity & Theorem 5 Or directly as follows

If A is symmetric, then by inspection T(A)=2A, so T(½ A)=A. (or office hours on Thursday)

**2g) True:** T(v1)=v1. T(v2)=v2 +v1. T(v3)=v3+v2. T(v4)=v4+v3. Hence [T]=$ ( \begin{matrix}\begin{matrix}1&1\\0&1\end{matrix}&\begin{matrix}0&0\\1&0\end{matrix}\\\begin{matrix}0&0\\0&0\end{matrix}&\begin{matrix}1&1\\0&1\end{matrix}\end{matrix} )$= upper 100%

*Goood Luck (in all languages).*