Class Survey Lec 22

1. $\vec{0}$ is an eigenvalue iff T is not injective

   True

2. Every L.T $T: V \to V$ has at least one eigenvalue

   Counter-ex: Rotation through $\frac{\pi}{3}$

   False

Class Survey Lec 21

1. The product of two square non-invertible matrices is not invertible.

   True.

   $\det(AB) = \det A \det B$

   $= 0 \cdot 0$

   $= 0 \Rightarrow$ not invertible

2. Suppose A and B are invertible. Then $\det A = \det B$.

   False.

   $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \Rightarrow \det A = 1$

   $B = \begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix} \Rightarrow \det B = 2$

   $\Rightarrow \det A \neq \det B$

3. Suppose A column reduces (after applying elementary row reductions on cols of A, we get B) to B then $\det(A) = \pm \det B$

   False. You could multiply by a scalar to a row.