Section 3.1 39 and 40

- An $n \times n$ determinant is defined by determinants of $(n-1) \times (n-1)$ submatrices. TRUEish I am a little unhappy about the defined by term in here since they are not completely defined by these submatrices.
- The (i,j)-cofactor of a matrix A is the matrix A_{ij} obtained by deleting from A its ith row and jth column. FALSE The cofactor is the determinant of this A_{ij} times -1^{i+j}.
- The cofactor expansion of det A down a column is the negative of the cofactor expansion along a row. FALSE We can expand down any row or column and get same determinant.
- The determinant of a triangular matrix is the sum of the entries of the main diagonal. FALSE It is the product of the diagonal entries.

- A row replacement operation does not affect the determinant of a matrix. TRUE Just make sure you don't multiply the row you are replacing by a constant.
- The determinant of A is the product of the pivots in any echelon form U of A, multiplied by $(-1)^r$, where r is the number of row interchanges made during row reduction from A to U. FALSE If we scale any rows when getting the echelon form, we change the determinant.
- If the columns of A are linearly dependent, then $\det A = 0$. TRUE (For example there is a row without a pivot so must be a row of all zeros.)
- $\det(A + B) = \det A + \det B$. FALSE This is true for product however.

- If two row interchanges are made in succession, then the new determinant equals the old determinant. TRUE Both changes multiply the determinant by -1 and -1*-1=1.
- The determinant of A is the product of the diagonal entries in A. FALSE unless A is triangular.
- If det A is zero, then two rows or two columns are the same, or a row or a column is zero. FALSE The converse is true, however.
- $\det(A^T) = (-1)\det A$. FALSE $\det(A^T) = \det A$ when A is $n \times n$.