Math 335-002
Homework #7
Due date: February 18 (not collected)

Note that on February 20 we are having our first Midterm Exam

1. Page 73: problems 4.1, 4.3, 4.4(a), 4.6, 4.8(a,b)

2. Page 82: problems 4.9, 4.10(a), 4.11

3. Re-write equation (a) in suffix notation and convert equation (b) into a vector equation (do not simplify):

a) $\boldsymbol{a} \cdot \boldsymbol{b} \times \boldsymbol{c} + (\boldsymbol{a} \cdot \boldsymbol{c})\,(\boldsymbol{a} \cdot \boldsymbol{b}) = 3\,|\boldsymbol{c}|^2$
b) $\varepsilon_{mkl}\, a_n\, d_l\, c_k\, b_n = a_k\, d_k\, c_n\, a_m\, b_n$

4. Simplify the following expressions:

a) $\delta_{kn}\, \delta_{jk}\, \delta_{ni}$
b) $\varepsilon_{jkm}\, \delta_{kn}\, \delta_{mj}$

5. Simplify and translate the following suffix notation equation into vector notation:

$$d_j\, b_k\, d_m\, \delta_{mk} + b_k\, c_m\, d_n\, c_k\, \varepsilon_{jmn} = \delta_{kl}\; a_m\, \delta_{lj}\, a_k\, b_m$$

6. Check the equation (4.12) on page 72 (the expansion of a product of alternating tensors in terms of the Kronecker delta tensor, same equation I've written in class) by calculating the left- and the right-hand sides of the equation for any two different sets of values of the free suffixes (*i*, *j*, *l*, and *m*). Choose at least one of these two suffix combinations in such a way that the two sides of the equation do not equal to zero.