Unit 2 Review Questions

1. Consider the non-zero vectors $\vec{a}$ and $\vec{b}$ such that $|\vec{b}| = 2|\vec{a}|$. If $8\vec{a} - \vec{b}$ and $4\vec{a} + 3\vec{b}$ are perpendicular vectors, then find the angle between vectors $\vec{a}$ and $\vec{b}$.

2. Let $\vec{x} = (1,1,0), \vec{y} = (0,-2,-2)$ and $\vec{z} = (1,0,1)$.

a) Find a unit vector perpendicular to $\vec{x}$ and $\vec{y}$.
b) Are the vectors coplanar?
c) Find the projection of $\vec{x}$ onto $\vec{y}$.
d) Find the angle between $\vec{x}$ and $\vec{y}$.
e) Show that there are two methods to calculate $(2\vec{x} - 3\vec{z}) \cdot (\vec{x} + \vec{\mathbf{z}})$

Review problems from the textbook :

Page 194 #3 – 12, (get correction for #11), 14

Page 197 #1 – 2, 4, 6, 7 (for number 7 –> start by looking at the final answer in the back of the textbook to see where you need to go with your expression and pretend it is a proof)

ANSWERS to #1 and #2

1. 120° 2. a) $\left(\frac{-\sqrt{3}}{3}, \frac{\sqrt{3}}{3}, \frac{-\sqrt{3}}{3}\right)$ or $\left(\frac{\sqrt{3}}{3}, \frac{-\sqrt{3}}{3}, \frac{\sqrt{3}}{3}\right)$ b) no c) (0, ½, ½) d) 120°

e) answer is -3 (one method is direct substitution, other method is to expand and simplify first.