Final Project – Chapter 12

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June 17, 2020

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   (a) Two vectors are parallel if they are scalar multiples of each other. For example, if $\vec{a} =< a_1, a_2, a_3 >$, a parallel vector would equal $c\vec{a}$, where c is a scalar. Therefore, if a vector is equal to another vector multiplied by a scalar, they are parallel.

   (b) Two vectors are orthogonal (perpendicular) simply if their dot product is equal to zero.

   (c) If two planes, one with equation $3x + y - 5z = 1$, and another with equation $6x + 2y - 10z = 3$ exist, it can be easily determined whether they are parallel. To do this, one must take a ratio of the coefficients, and, if the ratios are all the same value, then the planes are parallel. In this case, one would find that $\frac{6}{3} = \frac{2}{1} = \frac{-10}{-5} = 2$. Therefore, these two planes are parallel.