TMATH 126: Quiz 2

You may use:

- any kind of calculator that cannot access the internet and
- a one-sided 3×5" card for this quiz.

Show *all* your supporting work (numerically, algebraically, or geometrically) for each and simplify. *No credit* is given without supporting work.

1. [6] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true and provide a brief justification. Otherwise, circle F and provide a counterexample or brief justification.

    T   F   If $\overrightarrow{v}$ and $\overrightarrow{w}$ are 3 dimensional vectors, then $(\overrightarrow{v} \times \overrightarrow{w}) + (\overrightarrow{v} \cdot \overrightarrow{w})$ returns a vector.
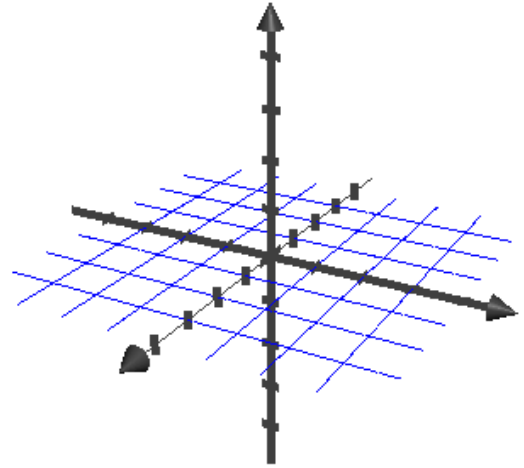
    T   F   The set of (x, y, z) defined by $\langle x, y, z \rangle = \langle 6, -3, 1 \rangle t + \langle 0, 0, 5 \rangle$ where $t \in \mathbb{R}$ form a line.

2. [3] (Suggested §11.3 #13) Find the angle between the vectors $\overrightarrow{u} = \langle 1, 1, 1 \rangle$ and $\overrightarrow{v} = \langle 2, 1, -1 \rangle$.

3. Consider the points $A(0,0,4)$, $B(3,3,0)$, and $C(0,1,0)$.

   (a) [1] Find the components of $\overrightarrow{BA}$.

   (b) [3] (WebHW8 #2) Find an equation for the line passing through A and B.

   (c) [4] (Dot&Cross Wks #3) Find the area of a triangle defined by A, B, and C.

4. [3] (WebHW7 #5) A 5400 pound SUV (large car) is parked on an $18°$ slope. Assume the only force to overcome is gravity. Find the force required to keep the SUV from rolling down the hill.