TMATH 126: Quiz 3

You may use any work of yours that you made from last week. This includes, practice problems from the book and worked out WebAssign problems. This *does not* include photocopies of notes from the book or tutorials shown on WebAssign. You may also use a calculator, but you are not allowed to use any device that can access the internet.

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

1. [8] 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 either counterexample or reasoning for your answer.

   Let $\vec{a}$, $\vec{b}$, and $\vec{c}$ be vectors in $\mathbb{R}$.
   Recall that $\cdot$ refers to the dot product, and $\times$ refers to the cross product.

   T   F $\vec{a} + \vec{b} = \vec{b} + \vec{a}$.

   T   F $(\vec{a} \cdot \vec{b}) \cdot \vec{c} = \vec{a} \cdot (\vec{b} \cdot \vec{c})$.
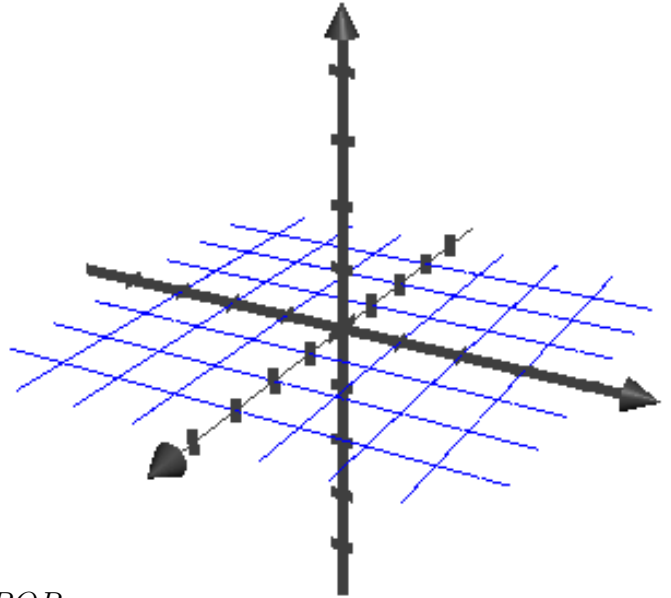
   T   F $(\vec{a} \cdot \vec{b}) \times \vec{c} = \vec{a} \cdot (\vec{b} \times \vec{c})$.

   T   F   The vectors $\langle 4, -8 \rangle$ and $\langle 2, 1 \rangle$ are perpendicular.

2. Consider the points: $P(2, -1, 0)$, $Q(4, 1, 1)$, and $R(4, -5, 4)$.

(a) [1] Plot the points P, Q, and R.

(b) [3] Find the length of $\overrightarrow{PQ}$

(c) [3] Find the area of the triangle PQR.

3. [5] Find the projection of of the vector $\overrightarrow{b} = \langle 1, 1, 2 \rangle$ only $\overrightarrow{a} = \langle -2, 3, 1 \rangle$.