TMATH 126: Quiz 3

You may use:

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

Show *all* your 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.

   T   F   If $\vec{a}$ and $\vec{b}$ are vectors, then $\vec{a}$ is parallel to $\vec{b}$ if and only if $\vec{a} \cdot \vec{b} = 1$.

   T   F   The vector $\langle 0, -1, 3 \rangle$ is equivalent to $\overrightarrow{AB}$ where $A = (2, 4, 0)$ and $B = (2, 3, 3)$.
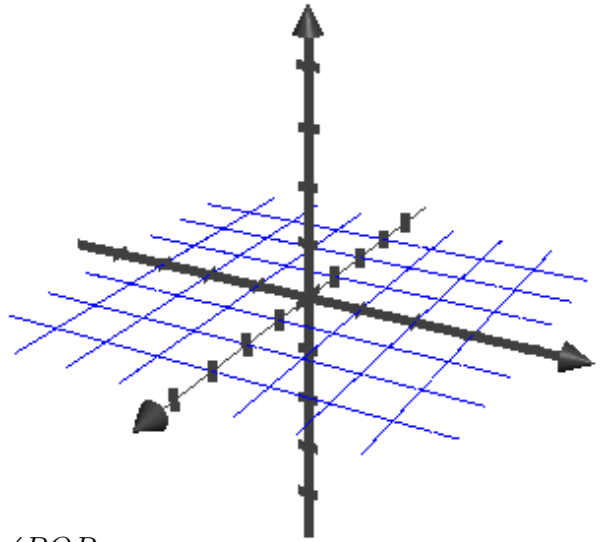
2. [1] Find the length of the vector $\vec{i}$

3. [3] (§12.1 #27 & §12.3) Describe in words the region of $\mathbb{R}^3$ represented by the inequality. (Optionally, you can try to draw it.)

   All (x, y, z) such that $\langle x, y, z \rangle \cdot \langle 1, 0, 0 \rangle = 0$.

4. Let $P = (0, 2, -1)$, $Q = (1, 2, 3)$
   and $R = (0, 0, 0)$.

   (a) [2] (Vector Wks #2) Label your
       positve x, y, and z axis and plot
       P, Q and R.

   (b) [4] (WebHW8 #6) Find the angle of $\angle PQR$

   (c) [4] (WebHW8 #14) Find a nonzero vector orthogonal (perpendicular) to the plane
       passing through P, Q, and R.