Math 283 Quiz 2 section 1: Sept 12

Name: SATOKO

If you cannot complete a problem (perhaps because you forgot a formula) but you think you know how, please describe. Correct methods will receive partial credits.

1. Find $|\mathbf{u} \times \mathbf{v}|$ and determine whether $\mathbf{u} \times \mathbf{v}$ is directed into the page or out of the page.

\[
|\mathbf{u} \times \mathbf{v}| = |\mathbf{u}| |\mathbf{v}| \sin \theta
\]

\[
= 2 \cdot 3 \cdot \sin \frac{\pi}{3}
\]

\[
= 6 \cdot \frac{\sqrt{3}}{2} = 3 \sqrt{3}.
\]

\[
\mathbf{u} \times \mathbf{v} \quad \text{into the page}
\]

2. Determine whether each statement is true or false (2 points for correct answer, 1 for no answer, and 0 for wrong answer).

(a) Two planes in three dimensional space perpendicular to a third plane are parallel.

(b) Two lines in three dimensional space perpendicular to a plane are parallel.

3. A vector equation of the line through the point $\mathbf{r}_0$ in the direction $\mathbf{v}$ is given by

\[
\mathbf{r} = \mathbf{r}_0 + t \mathbf{v}
\]

where $t$ is a real number.

(a) Find a vector equation of the line through the point $(1, 2, 3)$ and perpendicular to the plane $x + 3y - z = 5$.

\[
\mathbf{r} = <1, 2, 3> + t <1, 3, -1>.
\]

(b) Write the equation in part (a) in parametric form. If you were unable to do part (a), use $\mathbf{v} = (3, -1, 2)$ and $\mathbf{r}_0 = (4, 2, -8)$ (these are incorrect).

\[
\begin{align*}
x &= 1 + t \\
y &= 2 + 3t \\
z &= 3 - t.
\end{align*}
\]