

Math 114 Practice Questions for Final

1. Find a unit vector orthogonal to $\langle 1, 3, 4 \rangle$ and $\langle 0, 2, 1 \rangle$.
2. Find the point on the plane $2x + y + 3z = 5$ which is closest to $(0, 0, 0)$.
3. For the points $A(1, 2, 3)$, $B(3, 3, 5)$ and $C(-2, 6, 4)$, what is the angle $\angle BAC$?
4. Find the area of the triangle whose vertices are at the points $(0, 0, 0)$, $(1, 0, 3)$ and $(2, 1, 0)$. **Hint** : Make use of the formula for the area of a parallelogram.
5. Does the line

$$\begin{aligned}x &= 1 - 2t \\y &= 2 - t \\z &= 3 + 3t\end{aligned}$$

lie in the plane $x + y + z = 10$?

6. Find the values of a and b so that the vectors $\vec{v} = 2a\hat{\mathbf{i}} + 6\hat{\mathbf{j}} + 10\hat{\mathbf{k}}$ and $\vec{w} = 3\hat{\mathbf{i}} + 3b\hat{\mathbf{j}} + 15\hat{\mathbf{k}}$ are parallel.