

Math 245 - Practice Quiz # 1

Name: _____

Directions: Show **ALL** of your work. Answers that are not supported by calculations, graphs/diagrams, and explanations will **not** be given full credit.

1. (4 total points - 1 point each) Please circle either T (true) or F (false) for each of the below statements. There is no penalty for guessing. You DO NOT have to show your work to receive full credit.

A) T F The angle between \mathbf{w} and $-\mathbf{w}$ is π .

B) T F The set of all points a distance 1 from the z -axis in \mathbb{R}^3 is a sphere.

C) T F $\mathbf{u} = \hat{\mathbf{i}} - \hat{\mathbf{k}}$ is perpendicular to $\mathbf{v} = 3\hat{\mathbf{j}}$.

D) T F There exists $\mathbf{u} \in \mathbb{R}^3$ such that $\mathbf{u} \cdot \mathbf{0} \neq 0$.

2. (16 total points) Let $\mathbf{u} = -2\hat{\mathbf{i}} + 3\hat{\mathbf{k}}$ and $\mathbf{v} = 4\hat{\mathbf{i}} - 2\hat{\mathbf{j}} - 4\hat{\mathbf{k}}$.

A) (4 points) Find $2\mathbf{u} + \mathbf{v}$.

B) (6 points) Calculate $|\mathbf{v}|$. Use your answer to find the unit vector $\hat{\mathbf{v}}$ in the direction \mathbf{v} .

C) (6 points) Use your answer to part (B) to find the projection of the vector \mathbf{u} onto the vector \mathbf{v} .