

St John Baptist De La Salle Catholic School, Addis Ababa

Homework 1

3rd Quarter

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Notes, and use of other aids is allowed. Read all directions carefully and write your answers in the space provided. To receive full credit, you must show all of your work. **Cheating or indications of cheating and similar answers will be punished accordingly.**

Information

- The homework is due on **Wednesday, February 22**.
- You should Work on it **in groups** and consult me if you have any questions. Cheating within groups is unacceptable.
- For purposes of neatness and simplicity of grading, you should do the homework on an **A-4 paper**.

Questions

1. For vectors $\vec{A} = -\hat{i} - 4\hat{j} + 6\hat{k}$ and $\vec{B} = 3\hat{i} - 7\hat{j} - 3\hat{k}$, calculate:
 - (A) $\vec{A} + \vec{B}$
 - (B) $2\vec{A} - \vec{B}$
 - (C) Find the magnitudes of $\vec{A} + \vec{B}$ and $2\vec{A} - \vec{B}$ and the unit vectors in their directions.-
2. Find the unit vector of direction for the following vector quantities:
 - (I) $\vec{F} = 2\hat{i} - 3\hat{j} + 10\hat{k}$
 - (II) $\vec{B} = 5\hat{i} - 7\hat{j} + 15\hat{k}$
 - (III) $\vec{V} = 10\hat{i} - 7\hat{k}$
3. A two dimensional force vector has a magnitude of 30N and is acting at an elevation angle of 37 degrees with respect to the origin. Write the force vector in its component form.
4. For the two points in the Cartesian plane A(2, 8) and B(-3, 5), find their respective position vectors and calculate the magnitude of those vectors.
5. Show that the vectors $\vec{A} = \frac{10}{3}\hat{i} - 6\hat{j}$ and $\vec{B} = \frac{6}{5}\hat{i} + \frac{2}{3}\hat{j} + 10\hat{k}$ are perpendicular.
6. Find the angle between the vectors **A** and **B** in question 1.
7. For any vector \vec{A} , what is $\vec{A} \cdot \vec{A}$?

Advanced Problems

8. What is the projection of the force vector $\mathbf{G} = (\hat{i} - 5\hat{j} + 3\hat{k})\text{N}$ along the force vector $\mathbf{H} = (-3\hat{i} + \hat{j})\text{N}$?