Name: SOLUTIONS

Quiz #1 - September 2, 2008

1. Give the equation of a sphere with center (2, -3, 1) and radius 2.

\[(x-2)^2 + (y+3)^2 + (z-1)^2 = 4\]

2. Use vectors to decide if the triangle with vertices (1, -3, -2), (2, 0, -4) and (6, -2, -5) is right-angled.

\[
\vec{AB} = (1, 3, -2) \quad \vec{BC} = (4, -2, -1) \quad \vec{CA} = (-5, 1, 3)
\]

\[
\vec{AB} \cdot \vec{BC} = 0 \quad \text{so} \quad \vec{AB} \perp \vec{BC}
\]

Yes

\[\text{ABC is 90°}\]

Name: SOLUTIONS

Quiz #1 - September 4, 2008

1. Find a vector of length 5 that points in the same direction as (1, -1, 2).

\[\left|\begin{array}{l}
1
1
-1
\end{array}\right| = \sqrt{6}\]

\[\frac{5}{\sqrt{6}} (1, -1, 2) = \left(\frac{5}{\sqrt{6}}, \frac{-5}{\sqrt{6}}, \frac{10}{\sqrt{6}}\right)\]

2. Find the vector projection of \(\vec{b} = (-2, 3, -6)\) onto \(\vec{a} = (5, -1, 4)\).

\[
\text{proj}_{\vec{a}} \vec{b} = \frac{\vec{a} \cdot \vec{b}}{\vec{a} \cdot \vec{a}} \quad \vec{a} = \left(-\frac{37}{42}, \frac{15}{42}, 1\right)
\]