

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.

$$\begin{array}{ccc} \text{A} & \text{B} & \text{C} \\ \text{A} & \text{B} & \text{C} \end{array} \quad \begin{array}{l} (-5, -1, 3) \\ (-5, -1, 3) \end{array}$$
$$\vec{AB} = (1, 3, -2) \quad \vec{BC} = (4, -2, -1) \quad \vec{CA} = (-5, -1, 3)$$

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

yes
 $\triangle ABC$ is 90°

Name:

SOLUTIONS

Quiz #1 - September 4, 2008

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

$$|(1, -1, 2)| = \sqrt{6}$$

$$\frac{5}{\sqrt{6}}(1, -1, 2) \text{ or } \left(\frac{5}{\sqrt{6}}, \frac{-5}{\sqrt{6}}, \frac{10}{\sqrt{6}} \right)$$

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

$$\text{proj}_{\vec{a}} \vec{b} = \frac{\vec{a} \cdot \vec{b}}{\vec{a} \cdot \vec{a}} \vec{a} = \frac{-37}{42} (5, -1, 4)$$