Math 233 - Quiz 1

Name _____

January 21, 2021

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due January 28.

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1. (4 points) Let $\vec{u}$ be the vector from $P(-2, 5)$ to $Q(3, -1)$.

   (a) Find the component form of $\vec{u}$.

   (b) Compute $\|\vec{u}\|$.

   (c) Determine a vector of magnitude 5 whose direction is opposite that of $\vec{u}$.

   (d) What angle does $\vec{u}$ make with the positive x-axis? Write your answer in degrees, rounded to the nearest tenth.

2. (2 points) Let $\vec{u} = -3\hat{\imath} + 5\hat{\jmath}$ and let $\vec{v}$ be the 2D vector of magnitude 4 that makes a 120° angle with the positive x-axis. Compute $3\vec{u} + \vec{v}$ and then find its magnitude.

Turn over.

3. (1 point) Write an equation of the plane passing through $(1, -3, 2)$ that is parallel to the xz-plane.

4. (1 point) Use vectors to show that the points $A(1, 0, 1)$, $B(0, 1, 1)$, and $C(1, 1, 1)$ are not collinear.

5. (2 points) Let $\vec{a} = 3\hat{\imath} - \hat{\jmath} + 2\hat{k}$ and let $\vec{b} = \vec{v} - \vec{w}$, where $\vec{v} = 2\hat{\imath} + \hat{\jmath} + 4\hat{k}$ and $\vec{w} = 6\hat{\imath} + \hat{\jmath} + 2\hat{k}$. Find the measure of the angle between $\vec{a}$ and $\vec{b}$. Write your answer in radians, rounded to the nearest hundredth.