Name _____ **Date** _____

Math 112: Quiz 7.4, 7.5, 9.1, 9.2:

1. Find all the solutions to each equation in the interval $0 \le \theta \le 2\pi$.

a. $\sin\theta(2\cos\theta + 1) = 0$

b. $4\cos^2(x) - 3 = 0$

2. Let $\mathbf{u} = \langle -3, 4\rangle$, $\mathbf{v} = \langle 1, 2\rangle$. Find each of the following

a. $4\mathbf{u} - 2\mathbf{v}$

b. $\mathbf{u} \cdot \mathbf{v}$

c. $\text{proj}_{\mathbf{v}}\mathbf{u}$

d. $(\mathbf{u} + \mathbf{v}) \cdot (\mathbf{u} - \mathbf{v})$

3. Let $\mathbf{w} = \langle -2, 9 \rangle$, $\mathbf{y} = \langle -1, 2 \rangle$. Resolve $\mathbf{w}$ into u_1 and u_2, such that u_1 is parallel to $\mathbf{y}$ and u_2 is perpendicular to $\mathbf{w}$.

4. A boat is traveling through a current which is running 10mph due east. The boat has a speed of 45mph relative to still water and is headed in the direction of N 45° E. Find the true speed and direction of the boat. (hint: draw a picture/diagram)