Name_____

Precalculus Unit 9: 9.3-9.4 Vectors Worksheet

1. Given a vector with initial point $(-5,3)$ and terminal point $(15, 9)$, write the vector in component form.

2. Find the magnitude of the vector from #1.

3. Given $\vec{v} = \langle -1, -3 \rangle$ and $\vec{w} = \langle -3,6 \rangle$, find

   a.) $\vec{v} + \vec{w}$ b.) $\vec{v} - \vec{w}$ c.) $3\vec{v}$ d.) $2\vec{v} + 5\vec{w}$

4. Find a unit vector in the same direction as $\vec{v} = \langle -12, -5 \rangle$

5. Forces with magnitudes of 85 pounds and 50 pounds act on a single point. The angle between the forces is 15°. Find the magnitude of the resultant vector.

6. Find the dot product of $\vec{v} = \langle -1, -3 \rangle$ and $\vec{w} = \langle -3,6 \rangle$. Are these vectors orthogonal? Explain. Are these vectors parallel? Explain.

7. Find the angle between the vectors from #6.

8. A 500 pound motorcycle is headed up a hill at 12°. What force is required to keep the motorcycle from rolling back down the hill when stopped at a red light?

9. A tractor pulls a log 200 meters and the tension in the cable connecting the log to the tractor is approximately 1600 kilograms (15,691 Newtons). The direction of the force is 30° above horizontal. Find the work done.