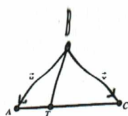Name: _____

1. F_1 is a force of 8N pulling an object due South, and F_2 is a force of 15N pulling the object due East. Find the direction, measured clockwise from North) and the magnitude of the resultant force F_3. Include a vector diagram as part of your solution.

2. In the diagram below, AT:TC = 2:3. If $\overline{BA} = \vec{u}$ and $\overrightarrow{BC} = \vec{v}$, express the following in the form $r\vec{u} + s\vec{v}$.

3. A plane is on a course of 200° at a speed of 520 mi/h. What are the north-south and east-west components of the plane's velocity vector?

4. Given the points A(2,4), B(0, –5) and C(7,0), find the coordinates of D(x,y) such that quadrilateral ABCE is a parallelogram.

5. An object moves with constant velocity so that its position at time t is given by the equation (x,y) = (1,3) + t(2, -3).
   a.) Find the objects velocity and speed.

   b.) Find a pair of parametric equations that correspond to the vector equation.

   c.) When and where does the object cross the parabola y = 2x² -6x?

6. Given points A(−2,4) and B(1,1)

   a.)   Express $\overrightarrow{AB}$ in component form. (Is this different from $\overrightarrow{BA}$? If so, how?)

   b.)   Find the coordinates of the point P that is 2/3 of the way from A to B.

7. Given $\vec{u}=(2,3)$ and $\vec{v}=(-1,5)$

   a.)   Show on a vector diagram the vectors $\vec{u}, \vec{v}$ and $\overrightarrow{u+v}$.
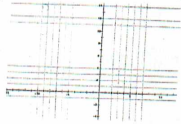
   b.)   Evaluate $\left\|\vec{u}+2\vec{v}\right\|$.

   c.)   Find the angle between $\vec{u}$ and $\vec{v}$.

8. Line L has the equation (x,y)=(−7,3) + t(−2,4) and line M has the equation (x,y)=(5,6)+t(3,k)

   a.)   What value of k makes the lines parallel?

   b.)   What value of k makes the lines perpendicular?

   c.)   Find the pair of parametric equations of a line through (8,9) parallel to L.