Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. A conic section has equation

$$4x^2 + 3y^2 - 8x + 24y + 40 = 0.$$

Identify the type of conic section, find its center and locate its vertices.

2. A hyperbola has vertices at $(5, 2)$ and $(9, 2)$ and its asymptotes have slopes ± 3. Find an equation for the hyperbola and locate its foci.

3. Consider the vectors $\boldsymbol{u} = \langle 4, 1 \rangle$ and $\boldsymbol{v} = \langle -3, 4 \rangle$.

   (a) Express the vector $3\boldsymbol{u} - 2\boldsymbol{v}$ in terms of the standard basis vectors.

   (b) Find a unit vector $\boldsymbol{e_v}$ in the direction of $\boldsymbol{v}$.

   (c) Express the vector $\boldsymbol{w} = \langle 29, -7 \rangle$ as a linear combination of $\boldsymbol{u}$ and $\boldsymbol{v}$.