Newton's Second Law: Step-by-Step Approach

1. Draw a sketch of the system if one not already drawn in book or on Xeroxed exam sheet.

2. Identify the forces acting on the objects, and draw force diagrams for each object in the system. These force diagrams should be separate from your original sketch.

3. Write down Newton's 2nd Law: $\vec{F}_{net} = m\vec{a}$.

4. Choose and indicate a coordinate system (i.e., **draw it next to your diagram**). Easiest case: have x-axis point in the direction of the acceleration, if you know what direction that is.

5. Break all vectors into components, and look at x-components and y-components **separately**. (Note: if everything falls on a straight line, you only need to consider one component.)

    - $\Sigma F_x = ma_x$ → the sum of the x-components of the force add up to the mass times the x-component of the acceleration.
    - $\Sigma F_y = ma_y$ → the sum of the y-components of the force add up to the mass times the y-component of the acceleration.

6. Solve for unknowns.