Circuit Analysis and Kirchoff's Rules

1. Label + and – for each battery.

2. Label the current in each branch of the circuit with a symbol and an arrow. Conventional current goes from + to -. If the current ends up being negative that means it was labeled incorrectly to begin with.

3. Apply kirchoff's loop rule to each loop. Use Ohm's law $V = I \times R$. Make sure you apply the loop rule for every loop in the same direction, either clockwise or counterclockwise. For a resistor the sign of the potential difference is negative if your chosen current is in the same direction as the loop direction. If the loop direction is in the opposite direction then the potential difference is positive.

4. For a battery, the sign of the potential difference is positive if your loop direction moves toward the positive; the sign will be negative if you are moving from the positive terminal toward the negative terminal.

5. Solve the equations for the unknowns. The number of unknowns dictate the required number of equations.