Name: _____

Directions: Solve the following problems. Give supporting work/justification where appropriate.

1. **[2 parts, 2.5 points each]** Prove or disprove the following.

   (a) If A and B are sets, then $\mathcal{P}(A - B) = \mathcal{P}(A) - \mathcal{P}(B)$.

   (b) If A, B, and C are sets, then $(A \cap B) - C = (A - C) \cap (B - C)$.

2. **[2 parts, 2.5 points each]** Prove or disprove the following.

   (a) If $x, y \in \mathbb{R}$ and $x^3 < y^3$, then $x < y$.

   (b) There exist integers a and b such that $42a + 63b = 3$.