Name: _____

Directions: All questions require explanation in English sentences.

1. [**3 points**] Write a definition of the set of integers that are powers of two using set-builder notation.

2. [**2 points**] What is $\mathcal{P}(\mathcal{P}(\mathcal{P}(\varnothing)))$?

3. [**3 points**] Let $A = \{x \in \mathbb{R}: x^2 - 4 \geq 0\}$ and $B = \{x \in \mathbb{R}: x^2 - 2x - 3 \geq 0\}$. Using set-builder notation, give simple descriptions of $A \cap B$ and $A \cup B$.

4. [**2 points**] Prove that $\mathcal{P}(A) \cup \mathcal{P}(B) \subseteq \mathcal{P}(A \cup B)$.