

PUMP2: Problem Set 1

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1 In-Set-tion

- (a) $\{\emptyset\}, \{1\}, \{2\}, \{cat\}, \{dog\}, \{1, 2\}, \{1, cat\}, \{1, dog\}, \{2, cat\}, \{2, dog\}, \{cat, dog\}, \{1, 2, cat\}, \{1, 2, dog\}$
- (b) $\sum_{k=1}^n \binom{n}{k} = 2^n$
- (c) *Proof.* We check the base case. When the set S has zero element, the powerset of S has only one element, the null set. It follows that 2^0 is 1. As a result, the base case is true. We assume for all n , the lemma stays true. We induct on n . \square