

Name: _____

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

1. [4 parts, 1 point each] Let $A = \{1, 2\}$, $B = \emptyset$, and $C = \{3\}$. Find the following sets.

(a) $\mathcal{P}(A)$

(c) $\mathcal{P}(B^0)$

(b) A^2

(d) $A \times C \times A$

2. [1 point] Is it true that $\mathbb{R}^3 = \mathbb{R}^2 \times \mathbb{R}$? Explain why or why not.

3. [1 point] Let $D = \{1, 2, 3, 4\}$. Express $\{X \subseteq D : |D| = 2\}$ by listing the elements between braces.

4. [1 point] Draw a picture of $[1, 2] \times (-1, 3]$ in the plane. Use solid lines to indicate boundaries in the set and dashed lines to indicate boundaries outside the set.

5. [6 parts, 0.5 points each] True/False. Write the entire word true or false. No justification necessary. We define:

$$A = \{1, 2, \{1, 2\}, \{\emptyset\}\} \quad B = \{1, \{1, 1\}, \emptyset\} \quad C = \{\{1\}\} \quad D = \{\emptyset\}$$

(a) $1 \in A$

(c) $1 \subseteq B$

(e) $D \in B$

(b) $C \in A$

(d) $C \subseteq B$

(f) $D \subseteq C$