

Math 2001

Practice with sets

1. Without looking in your textbook, write precise and complete definitions for subset, union, intersection, difference and complement.

•

•

•

•

•

2. Comment on this question: Find $\overline{A}$ if $A = \{2, 4, 6, \dots\}$.

3. Suppose that $A_0 = \emptyset$, $A_1 = \{\emptyset\}$, $A_2 = A_1 \cup \{A_1\}$, $A_3 = A_2 \cup \{A_2\}$, $\dots$, $A_n = A_{n-1} \cup \{A_{n-1}\}$.

(a) Write the sets A_2 , A_3 , and A_4 by listing their elements.

$$A_2 =$$

$$A_3 =$$

$$A_4 =$$

(b) $|A_5| =$

(c) $|A_n| =$

(d) $A_0 \cup A_1 \cup A_2 \cup A_3 \cup A_4 =$

(e) $A_0 \cap A_1 \cap A_2 \cap A_3 \cap A_4 =$

(f) $A_4 - A_2 =$

(g) $|A_4 - A_1| =$

(h) $|A_{20} - A_{14}| =$

(i) $|\mathcal{P}(A_{10})| =$

4. Write down the precise and complete definition of cartesian product:

5. Say $A = \{a, r, g\}$ and $B = \{x \in \mathbb{N} : x^2 < 5\}$.

(a) $|A \times B| =$

(b) Name an element in $A \times \mathcal{P}(A)$.

(c) $|A \times \mathcal{P}(A)| =$

(d) Give an example of an element in the set $(A \times B) \times A$.

(e) Give an example of an element in the set $A \times (B \times A)$.

(f) $A \times \emptyset =$

6. Write the following set by listing all of its elements:

$\{\{0\}, 1\} \times \{\emptyset\} =$