Math 365 – Quiz 1 – Wednesday 2/06/19

Solutions

Name

1. Compute $\mathcal{P}(\{1, \{a, b\}\})$.

$\mathcal{P}(\{1, \{a,b\}\}) = \{\emptyset, \{1\}, \{\{a,b\}\}, \{1, \{a,b\}\}\}$

(think: $\mathcal{P}(\{x, y\}) = \{\emptyset, \{x\}, \{y\}, \{x, y\}\}$)

2. Let $A = \{0, 5\}$ and $B = \{5, 7\}$, and compute the following.

(a) $A \times B = \{(a,b) \mid a \in A, b \in B\}$

$= \{(0,5), (0,7), (5,5), (5,7)\}$

(b) $A \cap B = \{x \mid x \in A \text{ and } x \in B\}$

$= \{5\}$

(c) $A \cup B = \{x \mid x \in A \text{ or } x \in B \text{ (or both)}\}$

$= \{0, 5, 7\}$

(d) $A - B = \{x \in A \mid x \notin B\}$

$= \{0\}$

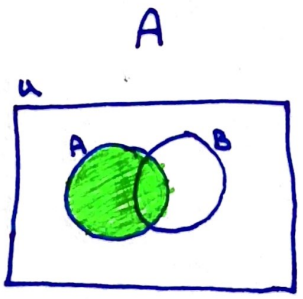
(e) $\{x \in B \mid x \geq 10\}$

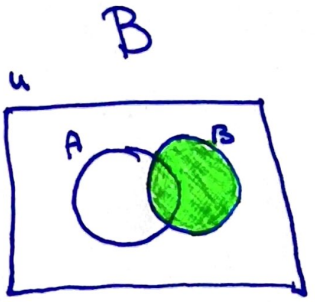
$= \emptyset$ (since $5 \not\geq 10$ and $7 \not\geq 10$)

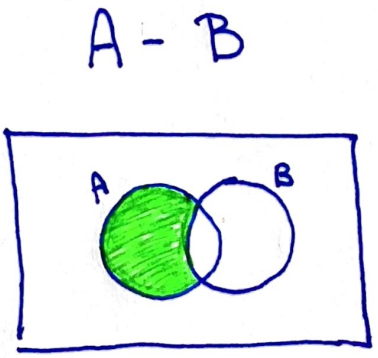
3. Let A and B be subsets of a universal set U. Compute the Venn diagram for

$$\overline{(A - B)}.$$

To show your work, draw a sequence of Venn diagrams as appropriate (labeling them by what set you're representing), but put your final answer in the picture indicated.







Final answer: Venn diagram for $\overline{(A - B)}$.