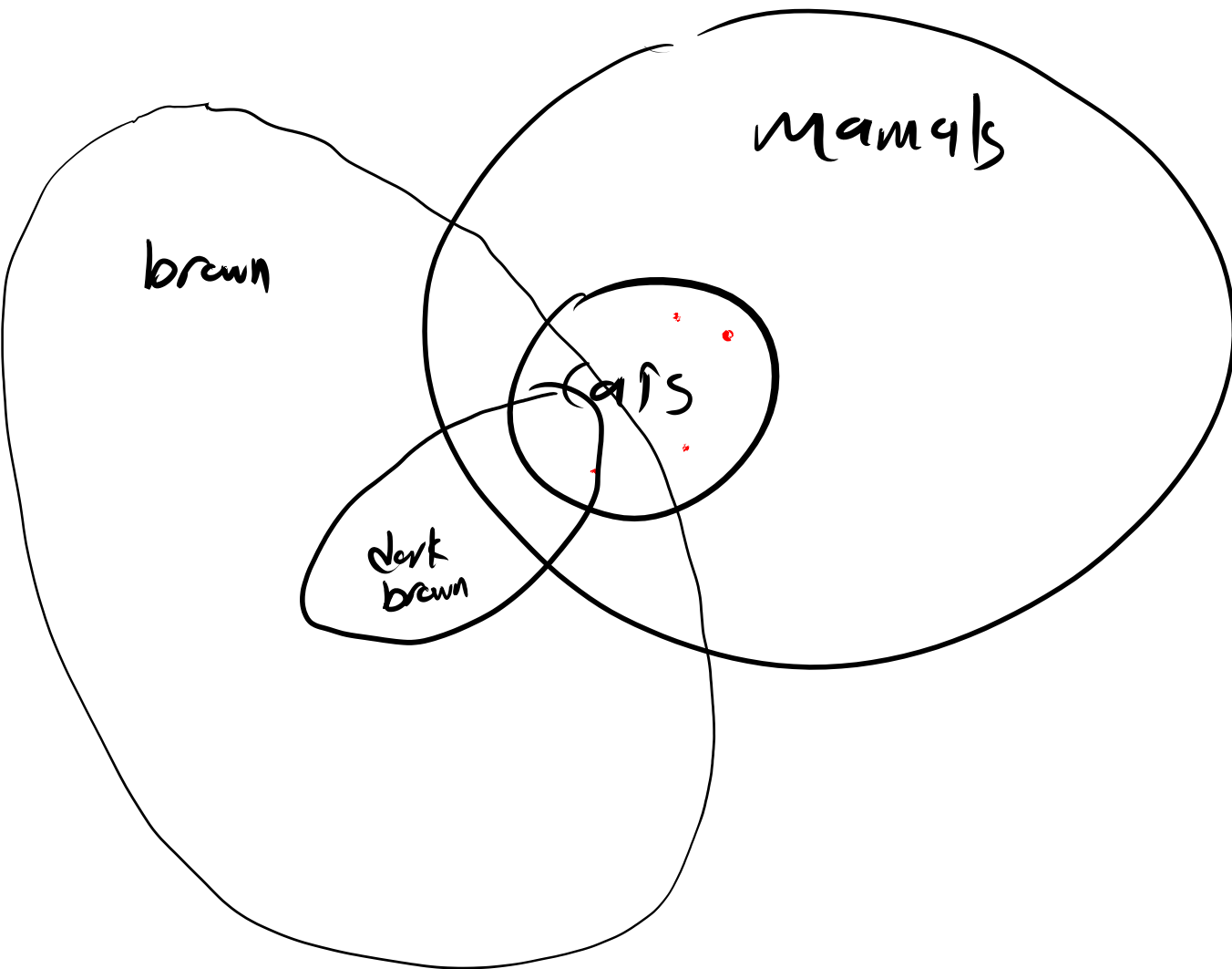
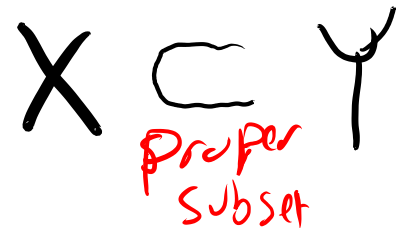


Cats is a Subset of Mamals

Brown animals



Subset Superset



Subset

Superset



$$X = \{1, 3, 7\}$$

$$Y = \text{odd numbers}$$

$$\mathbb{Z} = \text{integers}$$

$$\perp \equiv \{\{1\}, \{1, 2\}\} \subseteq X$$

$$\perp \equiv \{1, 4\} \subseteq X$$

$$\emptyset \subset X \equiv \perp$$

$$X \subset Y \equiv \top$$

$$Y \subset \mathbb{Z} \equiv \top$$

$$Y \subset X \equiv \perp$$

$$\{\} \subseteq X \equiv \top$$

$$\{\} \subseteq \{3\} \equiv \top$$

$$\{3\} \subset \{3\} \equiv \perp$$

\cup

Union

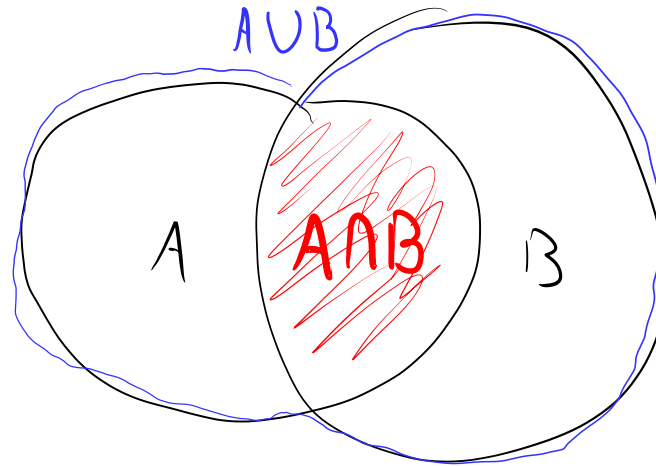
$$\{1\} \cup \{2\} \Rightarrow \{1, 2\}$$

$$\{1\} \cup \{1, 2\} \Rightarrow \{1, 2\}$$

$$\{\} \cup \mathbb{Z} \Rightarrow \mathbb{Z}$$

$$\{1, 2\} \cup \{\{1, 2\}\} \\ \{1, 2, \{1, 2\}\}$$

$$\{1, 4, 9\} \cup \{2, 4, 6, 8\} \\ \{1, 2, 4, 6, 8, 9\}$$



$$A \subseteq A \cup B$$

$$B \subseteq A \cup B$$

$$A \cap B \subseteq A \cup B$$

$$A \cap B \subseteq A$$

$$A \cap B \subseteq B$$

 \cap

Intersection

$$\{1\} \cap \{1, 2\} \Rightarrow \{1\}$$

$$\{1\} \cap \{2\} \Rightarrow \{\}$$

$$\{\} \cap \mathbb{Z} \Rightarrow \{\}$$

$$\{1, 3, 4\} \setminus \{1, 2\} = \{3, 4\}$$

$$\{1, 2\} \setminus \{\} = \{1, 2\}$$

$$\{\{\}, 1, 2\} \setminus \{\} = \{\{\}, 1, 2\}$$

$$\{\{\}, 1, 2\} \setminus \{\{\}\} = \{1, 2\}$$

$$(A \setminus B) \cup A = A$$



$$(A \setminus B) \cup B = A \cup B$$

A
{ }

$$(A \setminus B) \cap A = A \setminus B$$

$$(A \setminus B) \cap B = \{ \}$$

$$\mathcal{P}(\{1, 2\}) =$$

Pictures of students in class

$$\mathcal{P}(\text{students})$$

$$\left\{ \{1, 2\}, \{1\}, \{2\}, \{\} \right\}$$

number of members of $\mathcal{P}(A)$

= number of members of A

2

$$\{ x + y \mid x \in \{1, 2\} \wedge y \in \{3, 4\} \}$$

$$\{4, 5, 6\}$$

$$\{x^6 \mid x \in \mathbb{Z}\}$$

$$\{x^3 \mid \exists y \in \mathbb{Z} \cdot y^2 = x\}$$

0

1

64

$\left\{ \left\{ x \mid x = + \right\}, \left\{ 1 \right\} \right\}$

$\forall x \in \text{Students} . \text{getAnA}(x)$

$\exists x \in \text{Students} . \text{getAnA}(x)$

$$A = \{1, 2, 3\}$$

$$B = \{2, 4, 6\}$$

$$A \setminus B = \{1, 3\}$$

$$(A \setminus B) \cap A = \{1, 3\} \quad (\text{is } A \setminus B)$$

$$(A \setminus B) \cup A = \{1, 3, 2\} \quad (\text{is } A)$$