Empty Set

Prove $S = \emptyset$

Suppose $\exists x \in S$

Show a contradiction

Algebraic use Thm 5.2.2 p 272

if $A \cap C = \emptyset$ then

$(A \times B) \cap (C \times D) = \emptyset$

Suppose $\exists x \in (A \times B) \cap (C \times D)$

$x \in (A \times B)$ and $x \in (C \times D)$

$x = (m, n)$

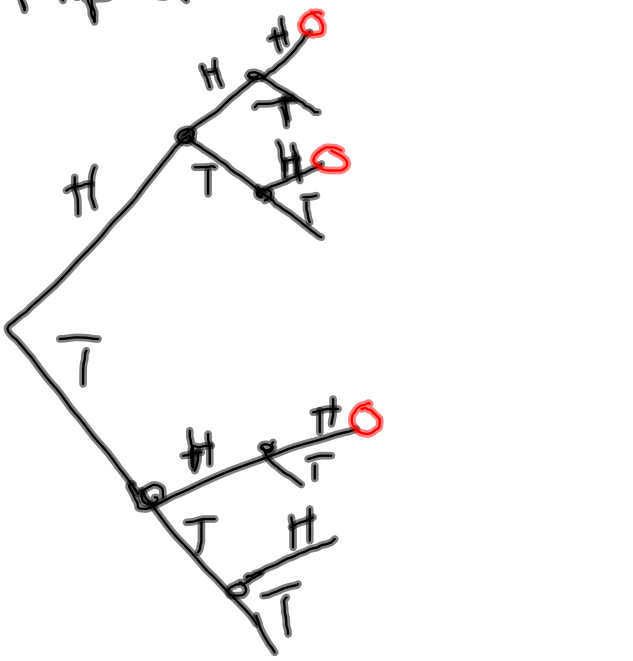
so $m \in A$ and $n \in B$

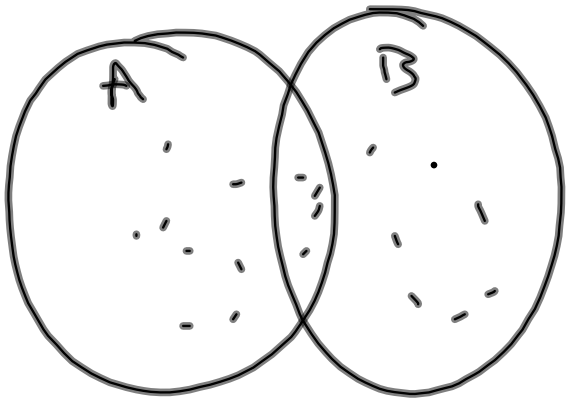
and $m \in C$ and $n \in D$

so $m \in (A \cap C)$

$\therefore A \cap C \neq \emptyset$

Flip a coin 3 times



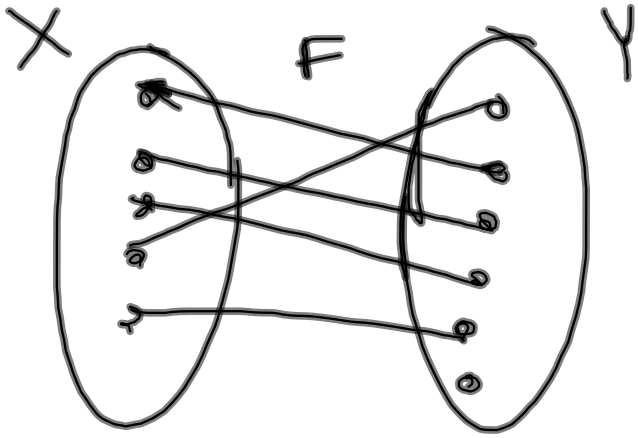


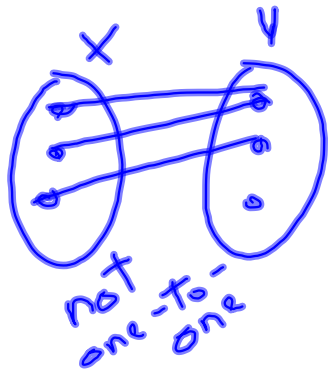
$$N(A \cup B) = N(A) + N(B) - N(A \cap B)$$

$F: X \to Y$ is one-to-one (injective)

iff $\forall\, x_1, x_2 \in X$

if $F(x_1) = F(x_2)$ then $x_1 = x_2$





Prove $f(x) = 4x - 1$ is one to one

Suppose $x_1, x_2 \in X$ s.t. $f(x_1) = f(x_2)$

$$4x_1 - 1 = 4x_2 - 1$$

$$4x_1 = 4x_2$$

$$x_1 = x_2$$

Prove $g(x) = x^2$ is not one to one

Find x_1, x_2 s.t. $x_1 \neq x_2$ and $g(x_1) = g(x_2)$