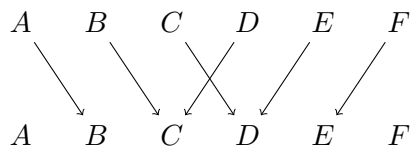


MATH 120 In-class Activity
Day 15

Question 1. Consider the function:



- (a) Compute $f(F)$
- (b) Compute $f(\{B, D\})$
- (c) Compute $f^{-1}(A)$
- (d) Compute $f^{-1}(\{C, D\})$

Question 2. Consider the set \mathbb{N}^2 of all ordered pairs (a, b) of natural numbers and the function

$$g : \mathbb{N}^2 \rightarrow \mathbb{N} \text{ defined by } g((a, b)) = a + b.$$

- (a) Let $A = \{(a, b) \in \mathbb{N}^2 : a, b \leq 10\}$. Find $g(A)$.

- (b) Find $g^{-1}(3)$ and $g^{-1}(\{0, 1, 2, 3\})$.

Hint: Drawing a picture of the points of \mathbb{N}^2 in the plane may be helpful.

Question 3. Let $f : X \rightarrow Y$ be a function and $A, B \subseteq X$ be subsets of the domain.

Consider the following two statements. Are they always true? Sometimes true? Never true?

(a) Is $f(A \cup B) = f(A) \cup f(B)$? Always, sometimes, or never? Explain.

(b) Is $f(A \cap B) = f(A) \cap f(B)$? Always, sometimes, or never? Explain.

Hint: At least one of the statements is **NOT** always true.