

MATH 3310 HOMEWORK ASSIGNMENT 2

DUE ON FRIDAY 1 FEBRUARY 2019

- (1) Consider the sets

$$U = \{x \in \mathbb{R} \mid |x - 2| < 5\},$$

$$V = \{x \in \mathbb{R} \mid |x + 1| \leq 3\}, \quad \text{and}$$

$$W = \{x \in \mathbb{R} \mid |x| > 2\}.$$

Use the interval notation to express the following sets:

- U .
- V .
- W .
- $U \cap V$.
- $V \cup W$.
- $U - W$.

- (2) For every real number x set

$$A_x = \{x^2\}, \quad B_x = (-\infty, x), \quad \text{and} \quad C_x = [x - 1, x + 1].$$

For $X = \{1, 3, 5, 7\}$ determine each of the following sets.

- $\bigcap_{x \in X} A_x$ and $\bigcup_{x \in X} A_x$.
- $\bigcap_{x \in X} B_x$ and $\bigcup_{x \in X} B_x$.
- $\bigcap_{x \in X} C_x$ and $\bigcup_{x \in X} C_x$.

- (3) Determine the set A_n in each of the following collections:

- $\{A_n\}_{n \in \mathbb{N}} = \{[0, 1], [0, 2], [0, 3], \dots\}$.
- $\{A_n\}_{n \in \mathbb{N}} = \{[1, 3], [1, 2 + \frac{1}{2}], [1, 2 + \frac{1}{3}], \dots\}$.
- $\{A_n\}_{n \in \mathbb{N}} = \{(-\frac{2}{3}, 3), (-\frac{5}{3}, 6), (-\frac{8}{3}, 9), \dots\}$.

- (4) Consider the set $A = \{a, b, c, d, e, f, g\}$. For each of the following collections of subsets of A decide if it is a partition of A , and if it is not explain why?

- $\{\{a, e\}, \{b, c, d, f, g\}\}$.
- $\{\{\}, \{a, e, f\}, \{b, c, d, g\}\}$.
- $\{\{a, g, b\}, \{e, f\}, \{b, c, d\}\}$.
- $\{\{a, b\}, \{c, d\}, \{f, g\}\}$.
- $\{\{a, e\}, \{b, d\}, \{f, g, c\}\}$.
- $\{A, \{a, b, c, d, e, f, g\}\}$.

- (5) Consider the set $A = \{a, b, c, d, e, f, g, h, i, j, k\}$ and give an example of a partition \mathcal{S} of A that satisfies

- $|\mathcal{S}| = 5$.
- $|X| \neq 3$ for all $X \in \mathcal{S}$.
- There is a subset \mathcal{T} of \mathcal{S} with $|\mathcal{T}| = 4$ and $|\bigcup_{X \in \mathcal{T}} X| = 9$.