

Name:_____

NetID:_____

Lecture: A B

Discussion: Thursday Friday 9 10 11 12 1 2 3 4 5 6

$$A = \{(x, y, z) \in \mathbb{R}^3 \mid 0 < x < y - 1\}$$

$$B = \{(a, b, c) \in \mathbb{R}^3 \mid b^2 + 2 < c^2\}$$

$$C = \{(p, q, r) \in \mathbb{R}^3 \mid p^2 < r^2\}$$

Prove that $A \cap B \subseteq C$.

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$$A = \{(x, y) \in \mathbb{R}^2 \mid x = \lfloor 3y + 5 \rfloor\}$$

$$B = \{(p, q) \in \mathbb{Z}^2 \mid 2p + q \equiv 3 \pmod{7}\}$$

Prove that $A \cap \mathbb{Z}^2 \subseteq B$.

Use the following definition of congruence mod k : if s, t, k are integers, k positive, then $s \equiv t \pmod{k}$ if and only if $s = t + nk$ for some integer n .

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$$A = \{(x, y) \in \mathbb{R}^2 \mid y = x^2 - 3x + 2\}$$

$$B = \{(p, q) \in \mathbb{R}^2 \mid p \geq 0\}$$

$$C = \{(m, n) \in \mathbb{R}^2 \mid n \geq 1\}$$

Prove that $A \subseteq B \cup C$.

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$$A = \{(x, y) \in \mathbb{R}^2 : |x + y + 2| < 5\}$$

$$B = \{(p, q) \in \mathbb{R}^2 : |p - q| < 3\}$$

$$C = \{(a, b) \in \mathbb{R}^2 : |ab| < 10\}$$

Prove that $A \cap B \subseteq C$.

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$$A = \{(x, y) \in \mathbb{Z}^2 \mid 2xy + 6y - 5x - 15 \geq 0\}$$

$$B = \{(a, b) \in \mathbb{Z}^2 \mid a \geq 0\}$$

$$C = \{(p, q) \in \mathbb{Z}^2 \mid q \geq 0\}$$

Prove that $(A \cap B) \subseteq C$.

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$$A = \{(x, y, z) \in \mathbb{R}^3 : |x + y + z| = 20\}$$

$$B = \{(a, b, c) \in \mathbb{N}^3 : a + b < 5\}$$

$$C = \{(p, q, r) \in \mathbb{R}^3 : r > 10\}$$

Prove that $A \cap B \subseteq C$.