Cartesian Product :→ → $|A| = 3$ → cardinality

(multiplication of sets)

$A = \{k, l, m\}$ $B = \{q, r\}$

$|B| = 2$

$A \times B = \{(k,q), (k,r), (l,q), (l,r), (m,q), (m,r)\}$

ordered pair

$B \times A = \{(q, k), (q, l), (q, m), (r, k), (r, l), (r, m)\}$

→ $A \times B \neq B \times A$

→ $|A \times B| = ?$ $|A| \times |B| = 3 \cdot 2 = 6$ →→ $|A \times B| = |B \times A|$

→ N, Z, R

$N \times N = ?$ $\{(x,y) : x \in N, y \in N\}$

II   I

III   IV

→ $N = \{0, 2, 3, 4, \dots\}$
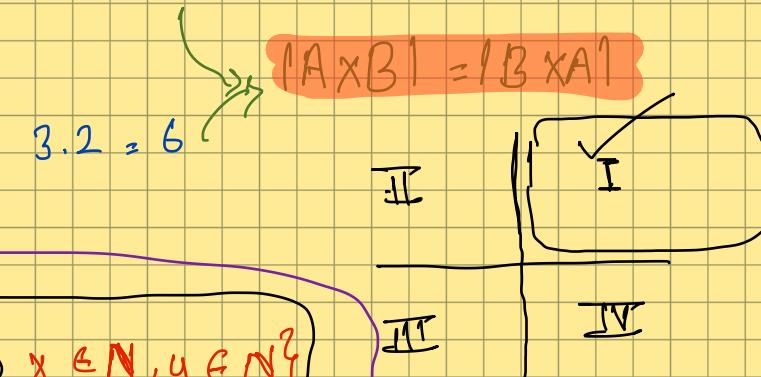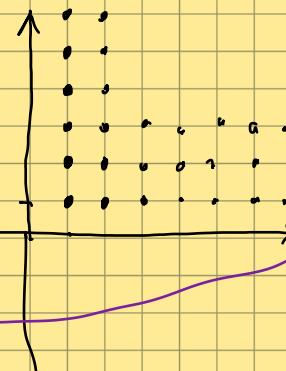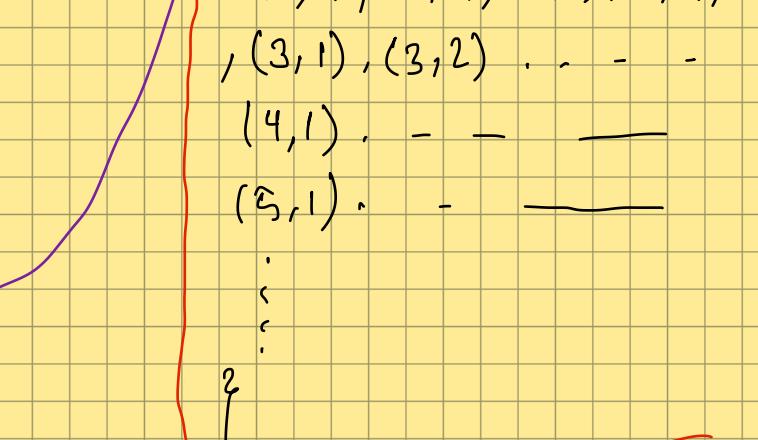
→ $N = \{1, 2, 3, 4, \dots\}$

$N \times N = \{(1,1), (1,2), (1,3), (1,4) \dots$
infinite $, (2,1), (2,2), (2,3), (2,4), \dots$
$, (3,1), (3,2) \quad . \quad - \quad -$
$(4,1) . \quad - \quad - \quad \underline{\quad}$
$(5,1) . \quad - \quad \underline{\quad}$
$\vdots$
$\}$

$N \times N$

→ $N \times R = \{(x,y) : x \in N, y \in R\}$

$\{(1, -3), (1, -2), (1, -1), (1, 0), (1, 1), (1, 2) \dots$
-2.9, -2.8, -2.7, ..., -2
$(2, -3) - \quad - \quad - \qquad - \quad - \quad - \quad -$
$(3, -3) . - \quad - \quad - \quad - \quad - \quad - .$
$\vdots$
$\}$

→ $R \times N$