

$$\begin{aligned}
 & x \in \mathbb{N} \\
 & P(x) \equiv x \geq 5 \\
 & A = \{x \mid P(x) = \text{TRUE}\} \\
 & A = \{5, 6, \dots\}
 \end{aligned}$$

م 18-01:11 ناب عش

How many integers i are there with $m \leq i \leq n$?

$$m \leq i \leq n$$

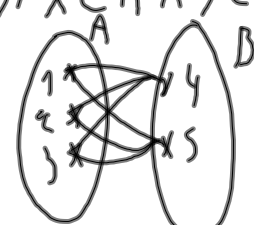
Example $2 \leq i \leq 5$

$$n - m + 1$$

م 18-01:36 ناب عش

$$\begin{aligned}
 & A = \{1, 2\} \mid A| = n \mid \in \mathbb{N} \\
 & P(A) = \{\emptyset, \{1\}, \{2\}, \{1, 2\}\} = 4 \\
 & A = \{1, 2, 3\} \\
 & P(A) = \{\emptyset, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}\} = 8
 \end{aligned}$$

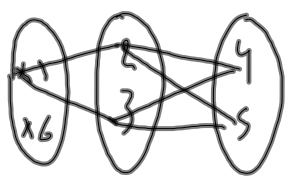
م 18-01:42 ناب عش

$$\begin{aligned}
 & A = \{1, 2, 3\} \in \mathbb{N} \\
 & B = \{4, 5\} \in \mathbb{N} \\
 & A \times B = \{(x, y) \mid x \in A \wedge y \in B\} \\
 & A \times B \neq B \times A \\
 & 5 \times 4 = 4 \times 5 \\
 & \{1, 4\} \\
 & \{4, 1\} \neq
 \end{aligned}$$


م 18-01:48 ناب عش

$$\begin{aligned}
 & A \times B = \{(1, 4), (1, 5), \\
 & \quad (2, 4), (2, 5), \\
 & \quad (3, 4), (3, 5)\} \\
 & B \times B = \{(4, 4), (5, 5), \\
 & \quad (4, 5), (5, 4)\}
 \end{aligned}$$

م 18-01:52 ناب عش

$$\begin{aligned}
 & A = \{1, 2, 3\} \\
 & B = \{4, 5\} \\
 & C = \{6\} \\
 & A \times B \times C = \{(1, 2, 4), \\
 & \quad (1, 2, 5), \\
 & \quad (1, 3, 4), \\
 & \quad (1, 3, 5)\}
 \end{aligned}$$


$A_1 \times \dots \times A_n$
 n -tuple
 n elements

م 18-01:54 ناب عش

m and n integers
 m is a multiple of n
 if $\boxed{m = kn}$ k integer
 m divides n
 m divisor of n

م 18-02:06 ناب عش

$$\begin{array}{l}
 48 = 2^4 \times 3 \\
 24 = 2^3 \times 3 \\
 12 = 2^2 \times 3 \\
 6 = 2 \times 3 \\
 3 = 3 \\
 1 = 1
 \end{array}
 \quad
 \begin{array}{l}
 48 = 2^4 \times 3 \\
 36 = 2^2 \times 3^2 \\
 18 = 2 \times 3^2 \\
 9 = 3^2 \\
 3 = 3 \\
 1 = 1
 \end{array}
 \quad
 \begin{array}{l}
 \text{GCD} = 2^2 \times 3 \\
 = 12
 \end{array}$$

م 18-02:11 ناب عش

$$\begin{array}{l}
 \text{LCM: } m = kn \\
 48 = 2^4 \times 3 \quad \leftarrow k_1 \times 48 \\
 36 = 2^2 \times 3^2 \quad \leftarrow k_2 \times 36 \\
 \text{LCM} = 2^4 \times 3^2 = 16 \times 9 \\
 = 144
 \end{array}$$

م 18-02:16 ناب عش

$$[a, b] \quad \begin{array}{c} \infty \quad a \quad b \quad +\infty \\ \hline \end{array}$$

$$\begin{aligned}
 [a, b] &= \{x \in \mathbb{R} : x \geq a \text{ and } x \leq b\} \\
 [a, b[&= \{x \in \mathbb{R} : x \geq a \text{ and } x < b\}
 \end{aligned}$$

م 18-02:21 ناب عش

$$\begin{aligned}
 [a, +\infty[&= \{x \in \mathbb{R} : x \geq a\} \\
 \{n \in \mathbb{N} : n \leq 3\} &= \emptyset \\
 \{x \in \mathbb{R} : x^2 < 0\} &= \emptyset \\
 \{x <
 \end{aligned}$$

م 18-02:28 ناب عش

$$\begin{aligned}
 \{x \in \mathbb{R} : x^3 < 0\} &=]-\infty, 0[\\
 \{r \in \mathbb{Q} : r^2 = e\} &= \{\sqrt{e}, -\sqrt{e}\} \\
 x^2 &= b \\
 x &= \sqrt{b}
 \end{aligned}$$

م 18-02:34 ناب عش

$\Sigma = \{\text{alphabet}\}$
 $\Sigma = \{a, b\}$
 $\Sigma^* = \{\lambda, a, b, aa, ab, ba, bba, aab, \dots\}$
 $\lambda =$
 λ : null string

م 18-02:40 ناب عث

$w = a\ ba$
 $\text{length}(w) = 3$
 $\text{length}(\lambda) = 0$
 $\Sigma = \{a, b\}$
 $A = \{w \in \Sigma^* : \text{length}(w) \leq 3\}$

م 18-02:44 ناب عث

$\Sigma = \{a, b\}$
 $\Sigma^* = \{\lambda, a, b, aa, bb, ab, ba, aab, aba, abb, bbb, bab, bba, baa, \dots\}$
 $A = \{ \dots \}$

م 18-02:48 ناب عث

List the elements in the following sets.
 $\{n \in \mathbb{N} : n^2 = 9\}$
 $\{x \in \mathbb{R} : x^2 = 9\}$
 $\{n \in \mathbb{Z} : 3 < |n| < 7\}$
 $\{x \in \mathbb{R} : x^4 < 0\}$

م 18-02:55 ناب عث

Let $A = \{n \in \mathbb{N} : n \leq 20\}$
 Determine the following sets:
 $\{n \in A : 4 \mid n\} = \{4, 8, 12, 16, 20\}$
 $\{n \in A : n \mid 4\} = \{1, 2, 4\}$
 $\{n \in A : \max(n, 4) = 4\} = \{0, 1, 2, 3, 4\}$
 $\{n \in A : \max(n, 14) = n\} = \{14, 15, \dots, 20\}$

م 18-03:06 ناب عث

$\{0, 1\} \subseteq]0, 1[$ FALSE
 $]0, 1[\subseteq [0, 1]$ TRUE
 $\{0, 1\} \subseteq [0, 1]$ TRUE

م 18-03:17 ناب عث