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Functions – introduction
Funkce – úvod

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Malý slovníček na úvod

Úkol: Vyhledejte, co znamenají česky následující pojmy.

Function
Graph
Set
Element
Coordinate Plane Cartesian Plane
x-axis / y-axis
x-coordinate / y-coordinate
Variable
Value
Domain
Range

Malý slovníček na úvod

Úkol: Vyhledejte, co znamenají česky následující pojmy.

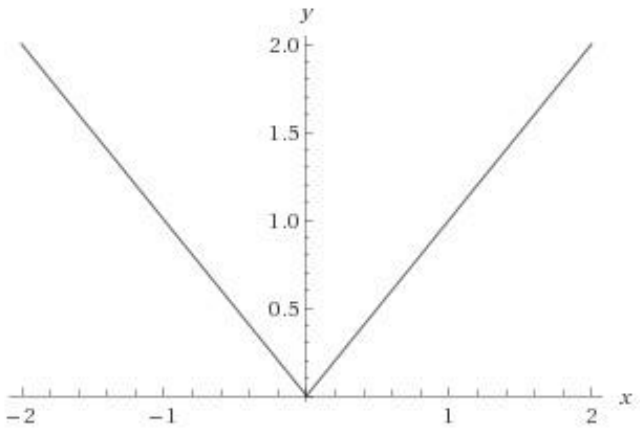
Function	Funkce
Graph	Graf
Set	Množina
Element	Prvek
Coordinate Plane Cartesian Plane	Soustava souřadnic
x-axis / y-axis	Osa X / Y
x-coordinate / y-coordinate	Souřadnice X / Y
Variable	Proměnná
Value	Hodnota
Domain	Definiční obor
Range	Obor hodnot

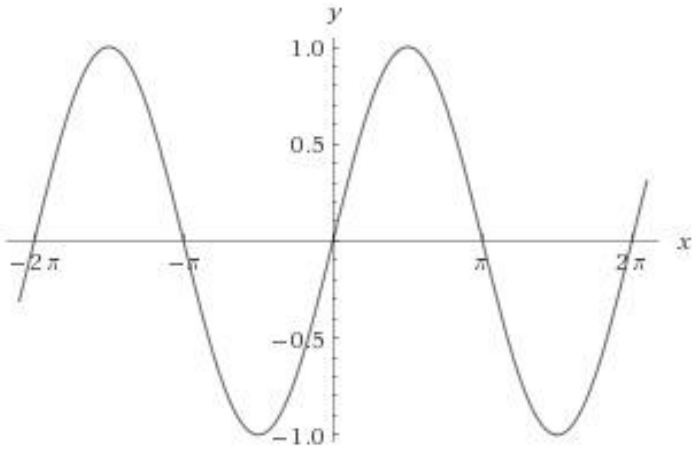
Function

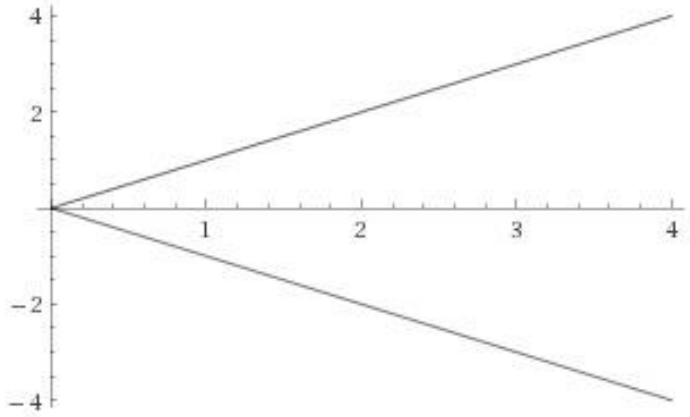
A relation for which each element of the domain corresponds to exactly one element of the range.

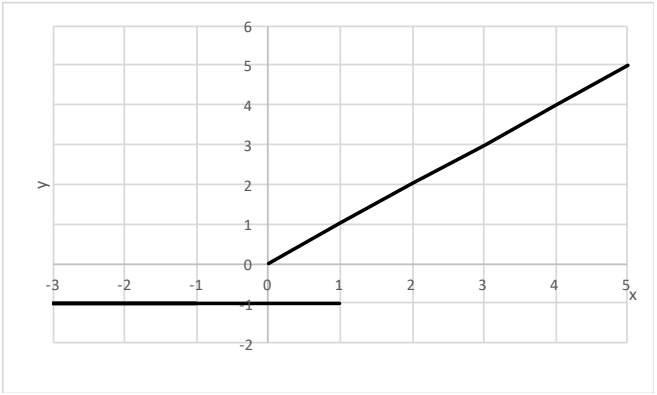
Funkce:
Zobrazení, které každé hodnotě z definičního oboru přiřadí právě jednu hodnotu z oboru hodnot

Task 1: Is it a function?









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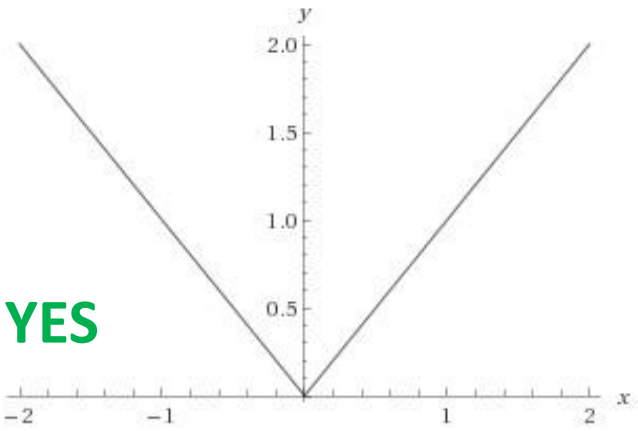
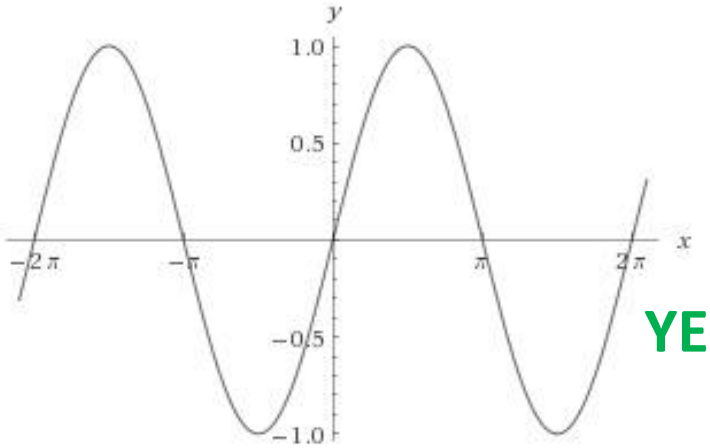
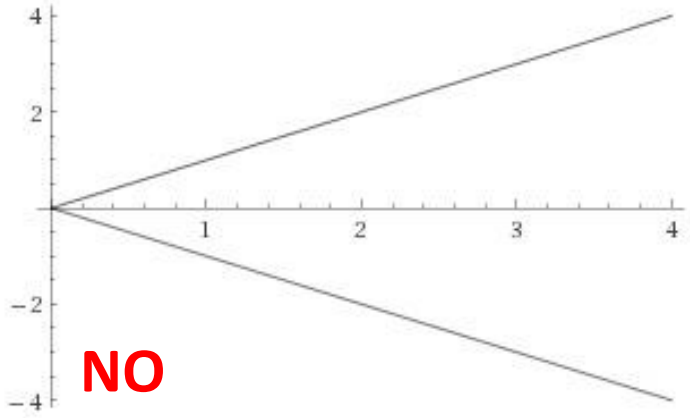


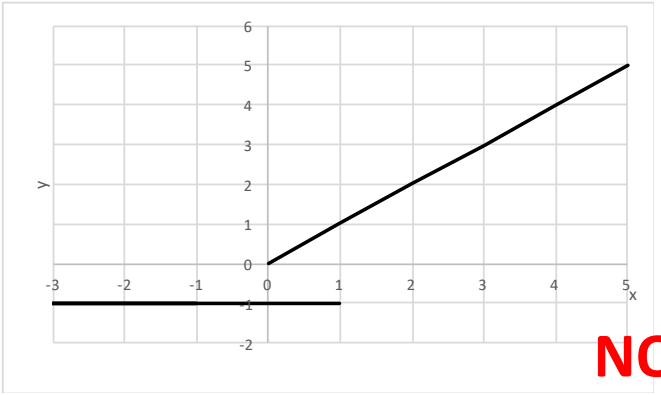
YES



YES



NO



NO

Domain

Domain of definition

The set of values of the independent variable for which a function is defined.

This is the set of x-values that give rise to real y-values.

Definiční obor:
Množina hodnot nezávislé proměnné, pro kterou je funkce definována.

Je to množina hodnot x, pro které existuje hodnota y.

Range

Range of function

The set of y-values of a function.

It is the set of values assumed by a function over all permitted values of the independent variable (x-values).

Obor hodnot:
Množina hodnot y funkce.

Množina všech hodnot přiřazených funkcí pro všechny povolené hodnoty nezávislé proměnné (hodnoty x).

Task 2: Determine the domain of following functions

1. $f(x): y = 3x + 5$
2. $f(x): y = \frac{1}{x^2+5x-6}$
3. $f(x): y = \frac{x^2+x}{x^3+2x^2+x}$
4. $f(x): y = \frac{x+3}{x-1}$
5. $f(x): y = \sqrt{2x + 3}$
6. $f(x): y = \sqrt{x^2 - 9x + 14}$
7. $f(x): y = \sqrt{\frac{x+1}{x-3}}$

Task 2: Determine the domain of following functions

1. $f(x): y = 3x + 5$ $\quad D_f = R$
2. $f(x): y = \frac{1}{x^2+5x-6}$ $\quad D_f = R\backslash\{-6; 1\}$
3. $f(x): y = \frac{x^2+x}{x^3+2x^2+x}$ $\quad D_f = R\backslash\{-1; 0\}$
4. $f(x): y = \frac{x+3}{x-1}$ $\quad D_f = R\backslash\{1\}$
5. $f(x): y = \sqrt{2x + 3}$ $\quad D_f = \left\langle -\frac{3}{2}; +\infty \right)$
6. $f(x): y = \sqrt{x^2 - 9x + 14}$ $\quad D_f = (-\infty; 2\rangle \cup \langle 7; +\infty)$
7. $f(x): y = \sqrt{\frac{x+1}{x-3}}$ $\quad D_f = (-\infty; -1\rangle \cup (3; +\infty)$

Task 3

We have function $f(x)$: $y = \frac{2x+3}{3x-2}$. Solve the following tasks:

A) Determine the domain of the function.

B) Determine the value $f(2)$, $f(5)$ and $f(11)$

C) Determine x-value, if $f(x) = 0$, $f(x) = 5$

Task 3

We have function $f(x)$: $y = \frac{2x+3}{3x-2}$. Solve the following tasks:

A) Determine the domain of the function.

B) Determine the value $f(2), f(5)$ and $f(11)$

C) Determine x-value, if $f(x) = 0, f(x) = 5$

Solution:

A) $D_f = R \setminus \left\{\frac{2}{3}\right\}$

B) $f(2) = \frac{7}{4}, f(5) = 1, f(11) = \frac{25}{31}$

C) $f(x) = 0 \ \ldots x = -\frac{3}{2} \quad f(x) = 5 \ \ldots x = 1$

Task 4

We have function $f(x)$: $y = \sqrt{x^2 + 4x + 5}$. Solve the following tasks:

A) Determine the domain of the function.

B) Determine the value $f(0)$ and $f(6)$

C) Determine x-value, if $f(x) = 0, f(x) = 2$

Task 4

We have function $f(x)$: $y = \sqrt{5 - 4x - x^2}$. Solve the following tasks:

A) Determine the domain of the function.

B) Determine the value $f(0)$ and $f(6)$

C) Determine x-value, if $f(x) = 0, f(x) = 2$

Solution:

A) $D_f = \langle -5; +1 \rangle$

B) $f(0) = \sqrt{5}, f(5) = 1, f(6) = -55$

C) $f(x) = 0 \ \ldots x = -5 \vee x = +1 \quad f(x) = 2 \ \ldots x = -2 \pm \sqrt{5}$