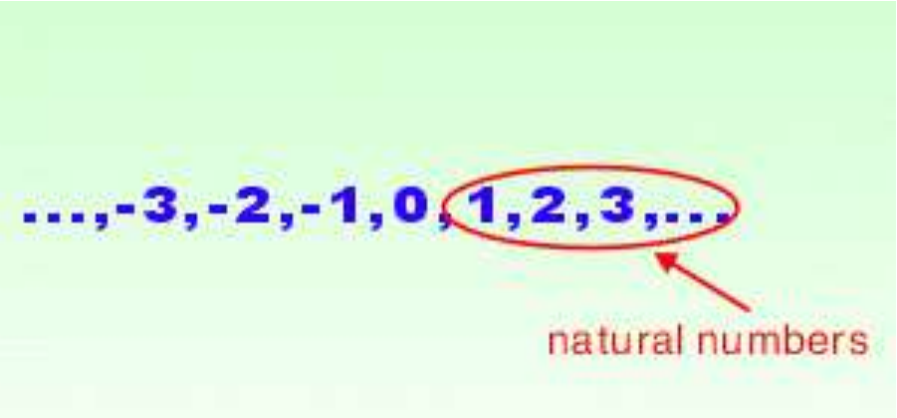
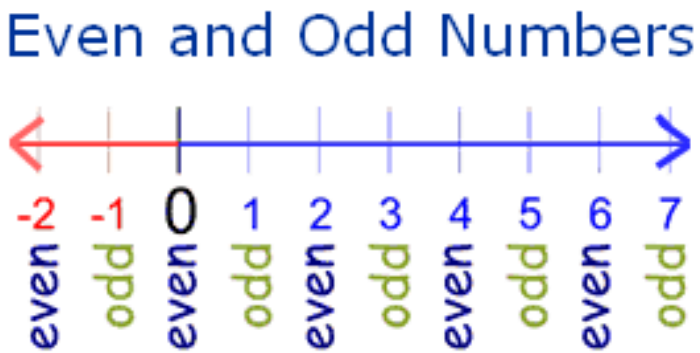
INTRODUCTION TO MATH

Example. Numerical sets
Set of natural numbers

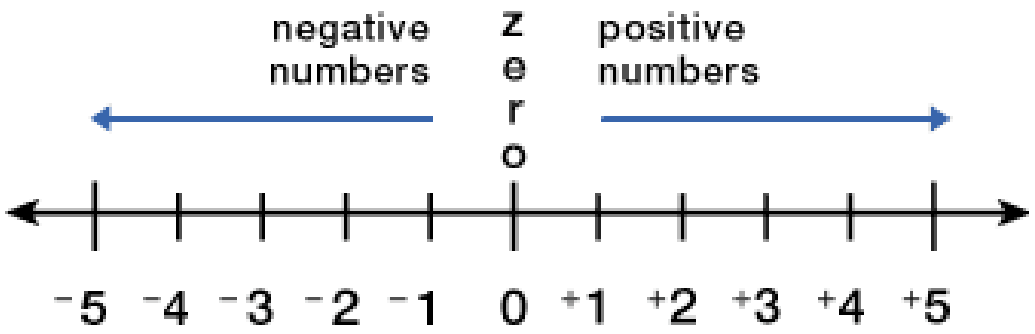


$$N = \{1;\ 2;\ 3;\ 4;\ ...,n,...\}$$

Example


Even and Odd Numbers
-2 -1 0 1 2 3 4 5 6 7
even odd even odd even odd even odd even odd

Example



Example

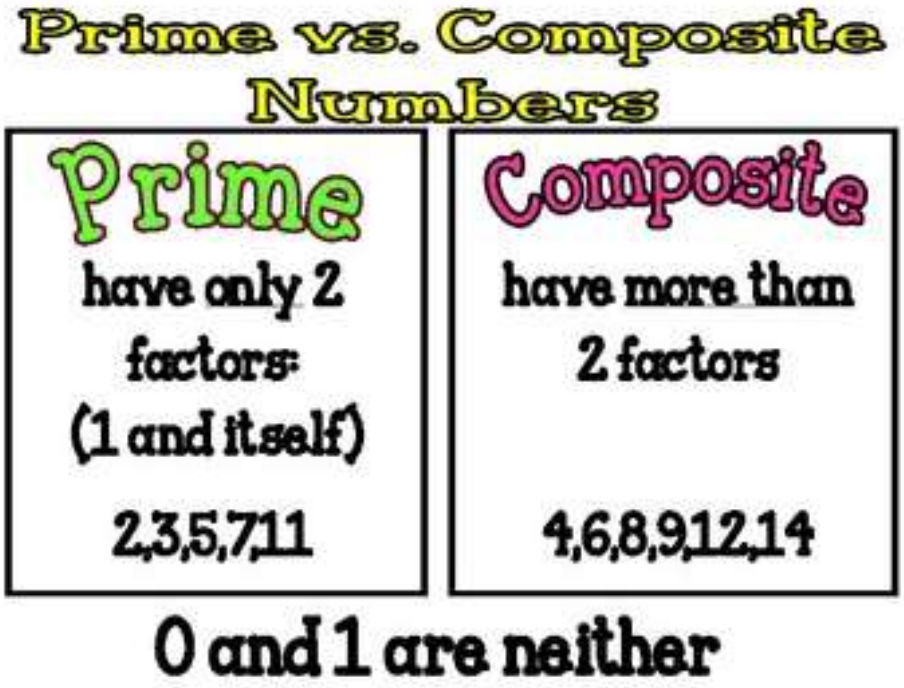
Prime Numbers

A number which only has two factors - itself and 1.

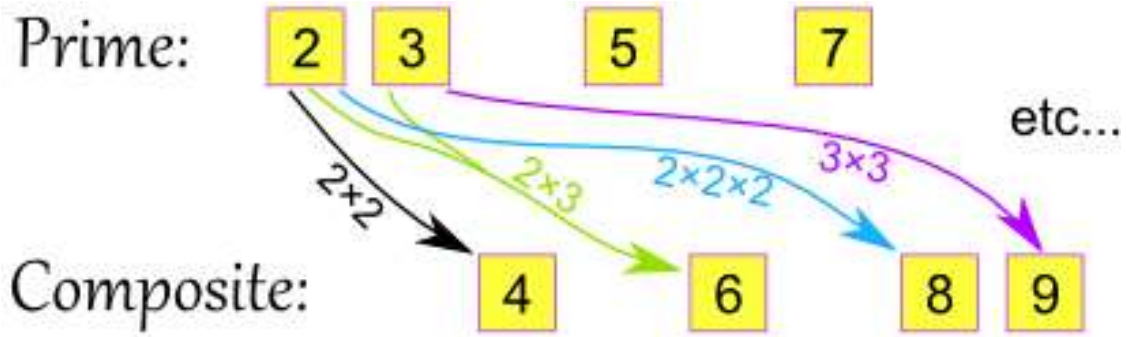
The first ten prime numbers are:
2 3 5 7 11 13 17 19 23 29

Example:
What is the next prime number after 11 ?
Check 12 - The factors of 12 are: 1 x 12, 2 x 6, 3 x 4, so 12 is not prime.
Check 13 - The only factors of 13 are 1 x 13, so 13 is a prime number

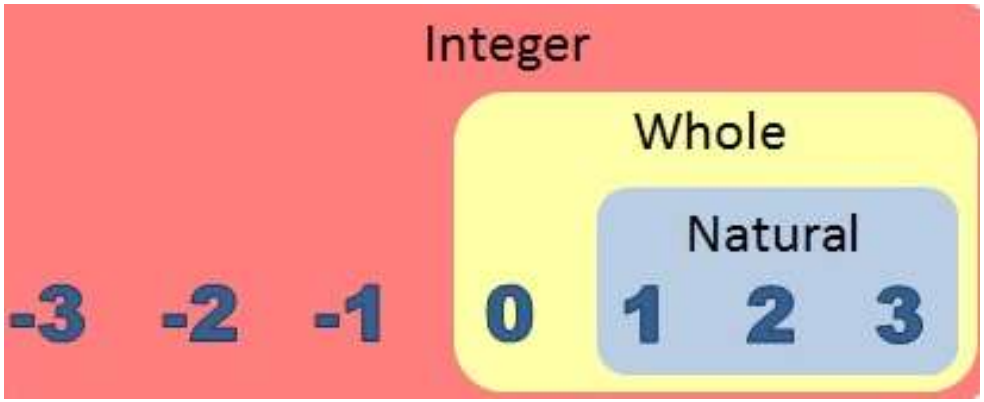
Example


Prime vs. Composite Numbers
Prime
have only 2 factors: (1 and itself)
2,3,5,7,11
Composite
have more than 2 factors
4,6,8,9,12,14
0 and 1 are neither

Example

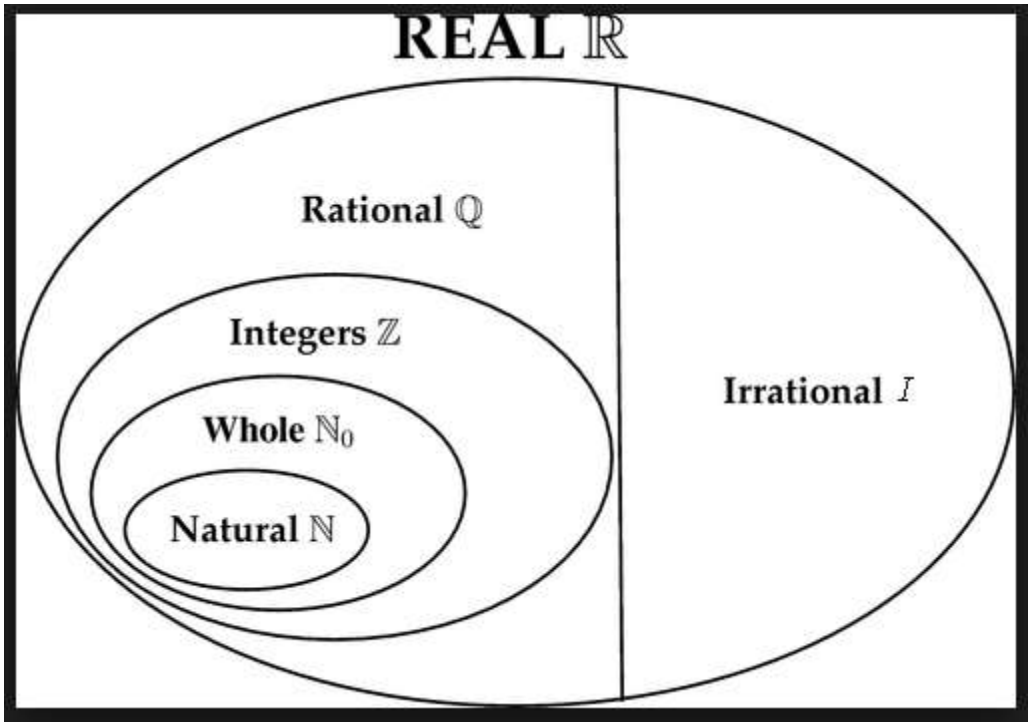


Example. Numerical sets



$$Z = \{0;\ \pm 1;\ \pm 2;\ \pm 3;\ \ldots;\ \pm n;\ \ldots\}$$

Example



$$I = R \setminus Q$$

$$N \subset Z \subset Q \subset R$$

Basic arithmetic operations with numbers

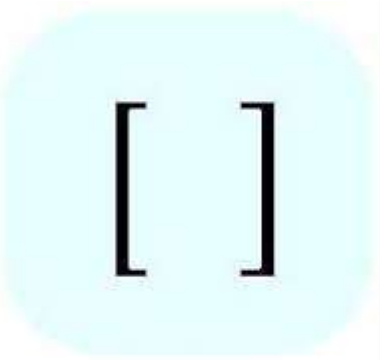
- (+)
- (-)
- (*)
- (:)

Basic arithmetic operations with numbers

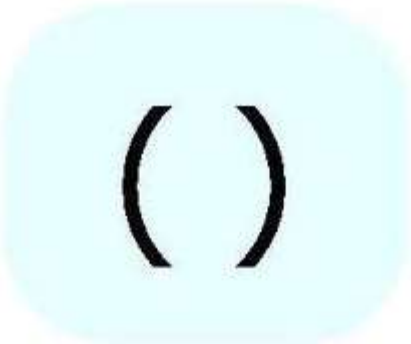
- Addition (+)
- Subtraction (-)
- Multiplication (*)
- Division(:)

Example

Square brackets

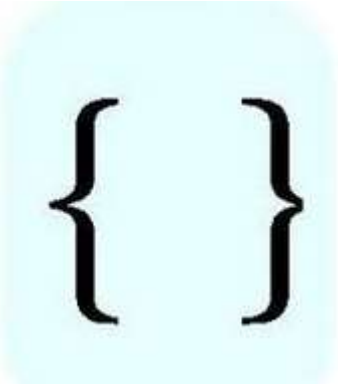


Example
Round brackets



Example

Braces

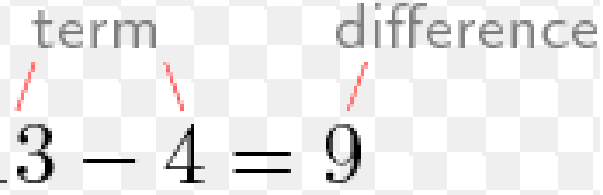


Example

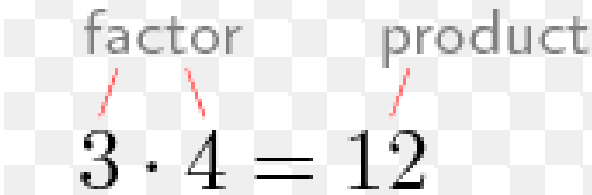
Basic operations with numbers

Addition

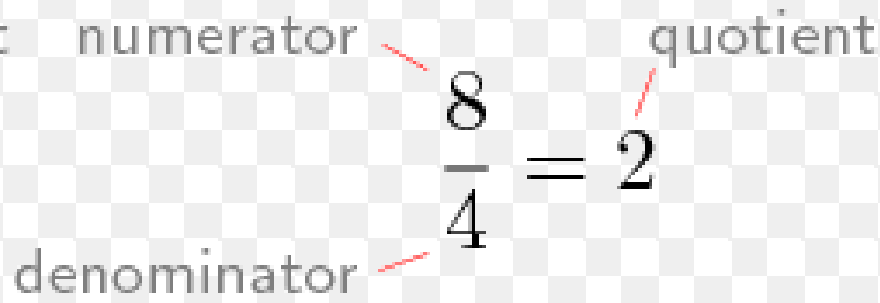
Subtraction



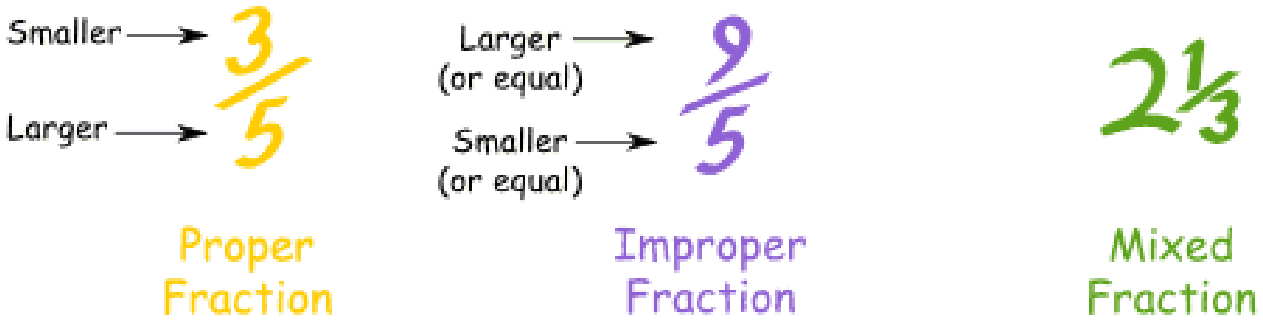
Multiplication



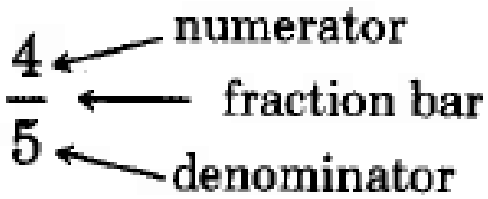
Division



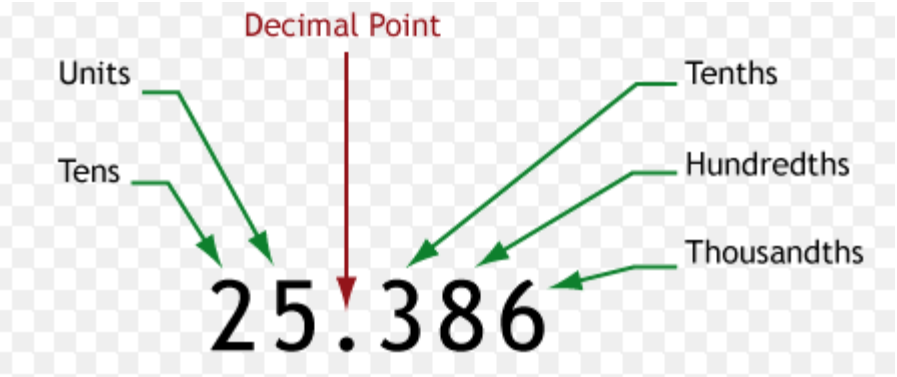
Example
Ordinary fractions



Example
Ordinary fractions

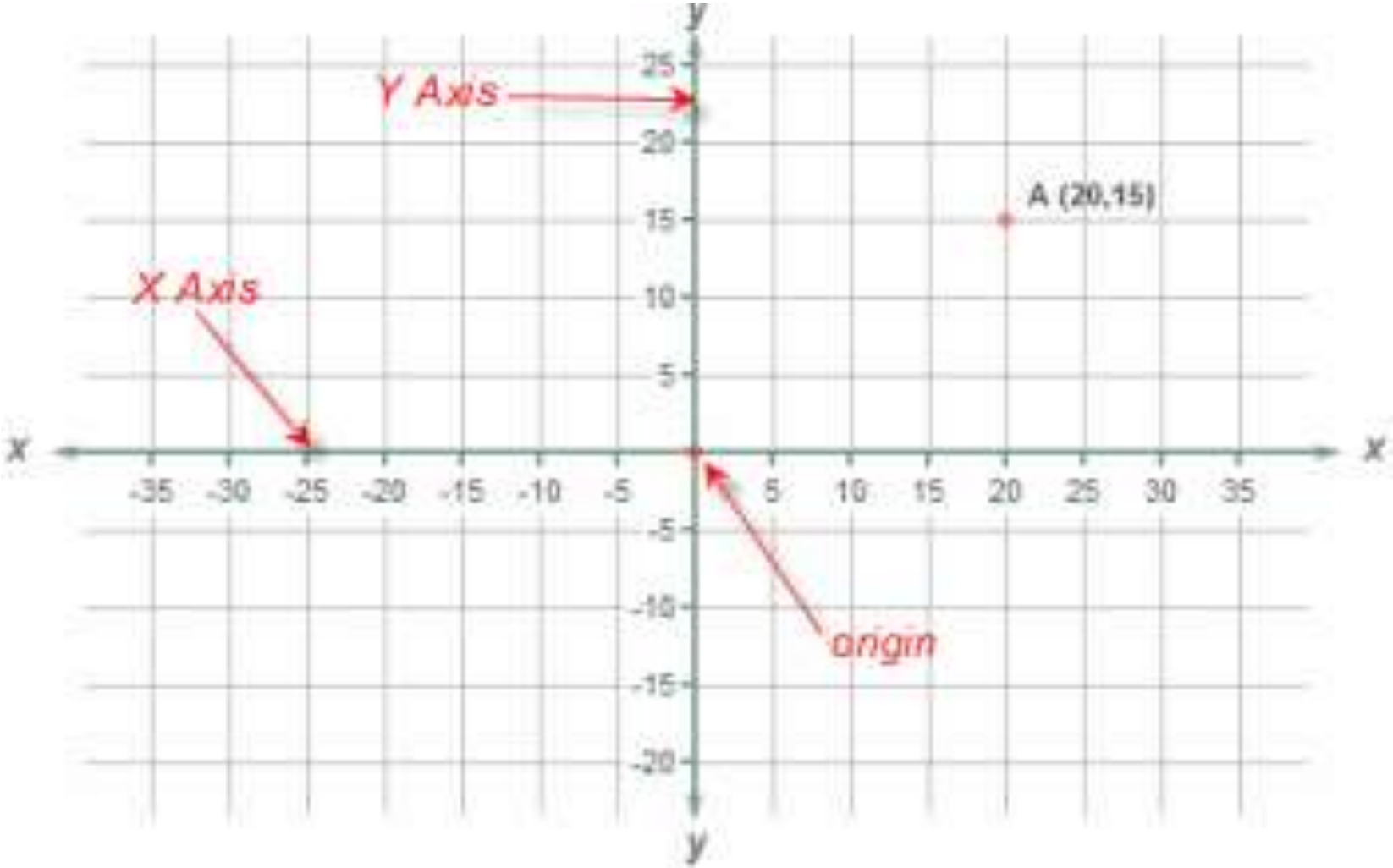


Example
Decimal fractions



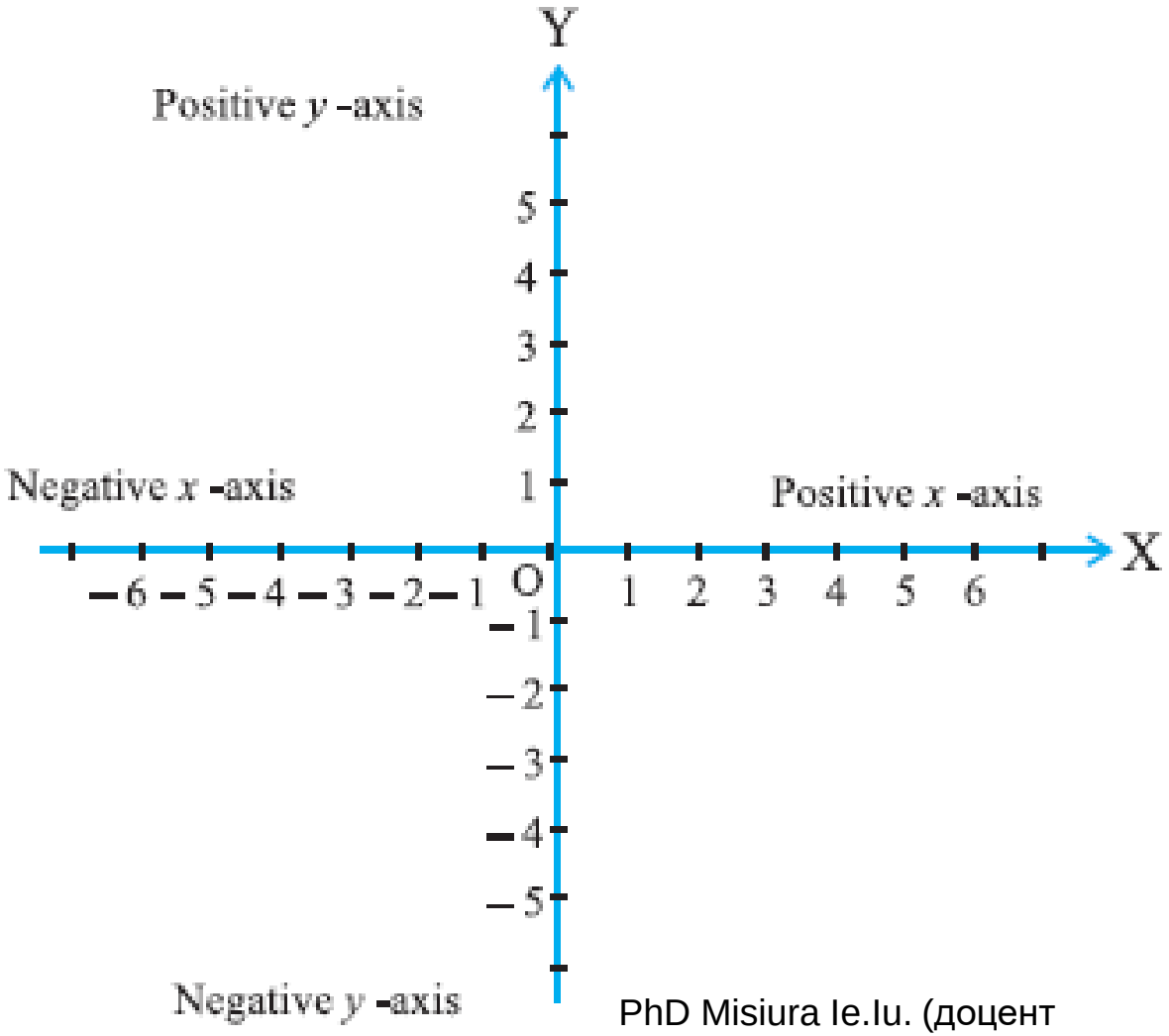
Example

Axes



Example

Axes



Given an example
Greek alphabet

Α	α	alpha	Ι	ι	iota	Ρ	ρ	rho
Β	β	beta	Κ	κ	kappa	Σ	σ	sigma
Γ	γ	gamma	Λ	λ	lambda	Τ	τ	tau
Ε	ε	epsilon	Μ	μ	mu	Υ	υ	upsilon
Δ	δ	delta	Ν	ν	nu	Φ	φ	phi
Ζ	ζ	zeta	Ξ	ξ	xi	Χ	χ	chi
Η	η	eta	Ο	ο	omicron	Ψ	ψ	psi
Θ	θ	theta	Π	π	pi	Ω	ω	omega

Some sets of numbers

1. Write down elements of set of natural numbers (N).
2. Write down elements of set of integers (Z).
3. Write down elements of set of real numbers (R).

Mathematical expressions

$x + 1$	x plus one
$x - 1$	x minus one
$x \pm 1$	x plus or minus one
xy	xy / x multiplied by y
$(x - y)(x + y)$	x minus y, x plus y
$\frac{x}{y}$	x over y
$=$	the equals sign
$x = 5$	x equals 5 / x is equal to 5
$x \neq 5$	x (is) not equal to 5

Mathematical expressions

$x \equiv y$	x is equivalent to (or identical with) y
$x \not\equiv y$	x is not equivalent to (or identical with) y
$x > y$	x is greater than y
$x \geq y$	x is greater than or equal to y
$x < y$	x is less than y
$x \leq y$	x is less than or equal to y
$0 < x < 1$	zero is less than x is less than 1
$0 \leq x \leq 1$	zero is less than or equal to x is less than or equal to 1

Mathematical expressions

$\lvert x \rvert$	mod x / modulus x
x^2	x squared / x (raised) to the power 2
x^3	x cubed
x^4	x to the fourth / x to the power four
x^n	x to the nth / x to the power n
x^{-n}	x to the (power) minus n
$\sqrt{x}$	(square) root x / the square root of x
$\sqrt[3]{x}$	cube root (of) x
$\sqrt[4]{x}$	fourth root (of) x
$\sqrt[n]{x}$	nth root (of) x
$(x+y)^2$	x plus y all squared
$\left(\frac{x}{y}\right)^2$	x over y all squared

Mathematical expressions

$n!$	n factorial
$\hat{x}$	x hat
$\bar{x}$	x bar
$\tilde{x}$	x tilde
x_i	xi / x subscript i / x suffix i / x sub i
$\sum_{i=1}^{n} a_i$	the sum from i equals one to n a_i / the sum as i runs from 1 to n of the a_i

Mathematical expressions

$x \in A$	x belongs to A / x is an element (or a member) of A
$x \notin A$	x does not belong to A / x is not an element (or a member) of A
$A \subset B$	A is contained in B / A is a subset of B
$A \supset B$	A contains B / B is a subset of A
$A \cap B$	A cap B / A meet B / A intersection B
$A \cup B$	A cup B / A join B / A union B
$A \setminus B$	A minus B / the difference between A and B
$A \times B$	A cross B / the cartesian product of A and B

Mathematical expressions

$f(x)$	fx / f of x / the function f of x
$\lim_{x \to 0}$	the limit as x approaches zero
$\lim_{x \to +0}$	the limit as x approaches zero from above
$\lim_{x \to -0}$	the limit as x approaches zero from below
$\log_e y$	log y to the base e / log to the base e of y / natural log (of) y
$\ln y$	log y to the base e / log to the base e of y / natural log (of) y