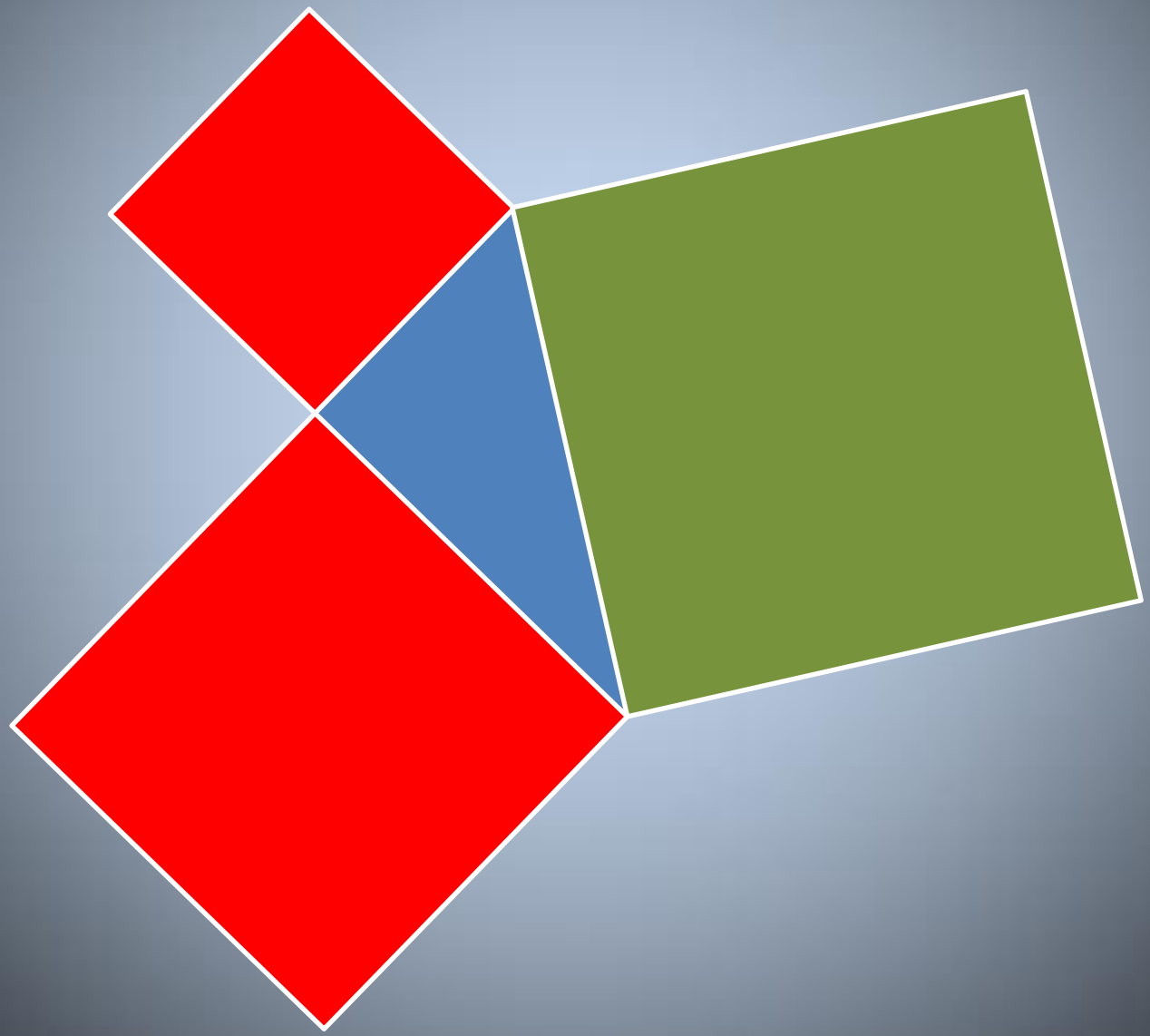
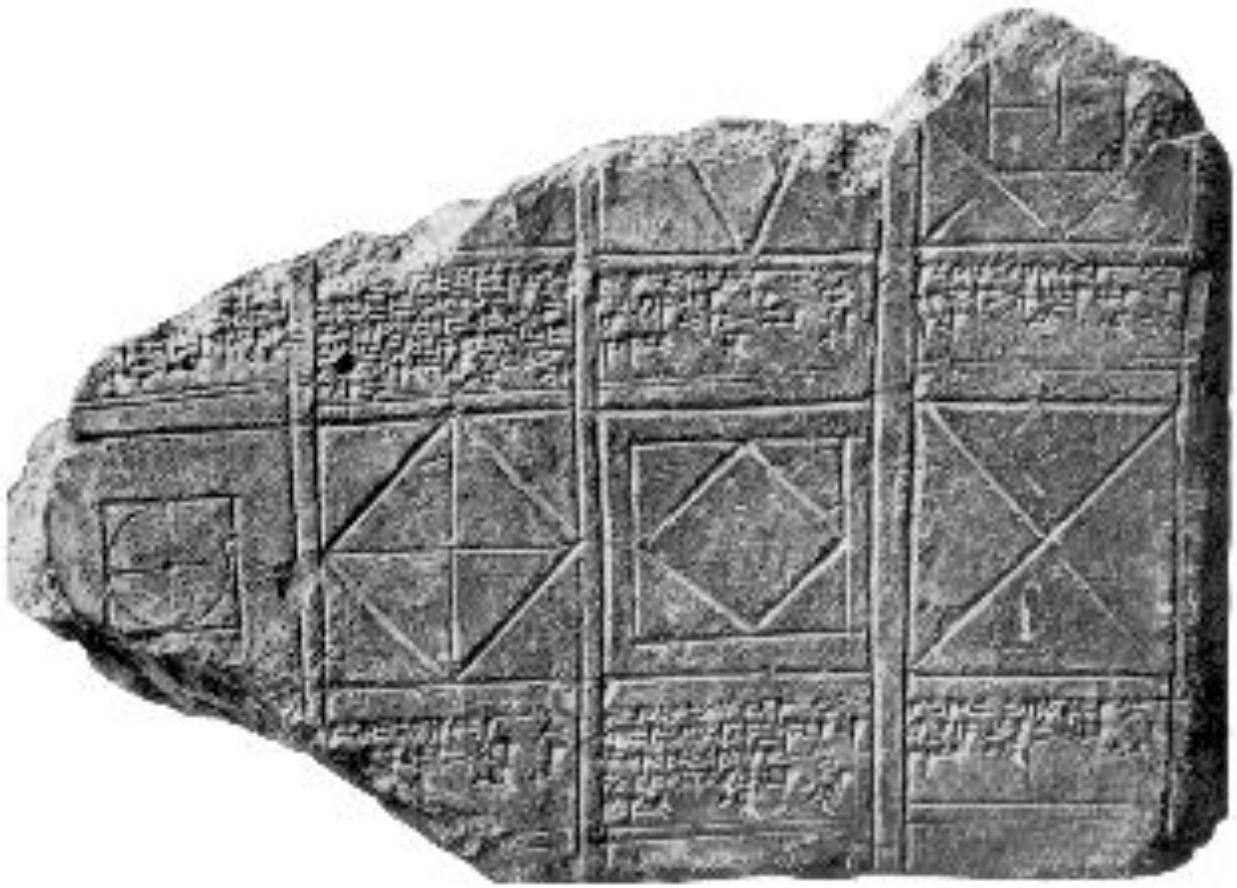
OFFICE SOFTWARE AS A MATHEMATICAL TOOL

Leszek Rudak
University of Warsaw
Centre for Open and Multimedia Education

The Pythagorean Theorem



The oldest known proof:



http://www.sunsite.ubc.ca/DigitalMathArchive/Euclid/java/html/babylon.html

Proof by Garfield (1876)

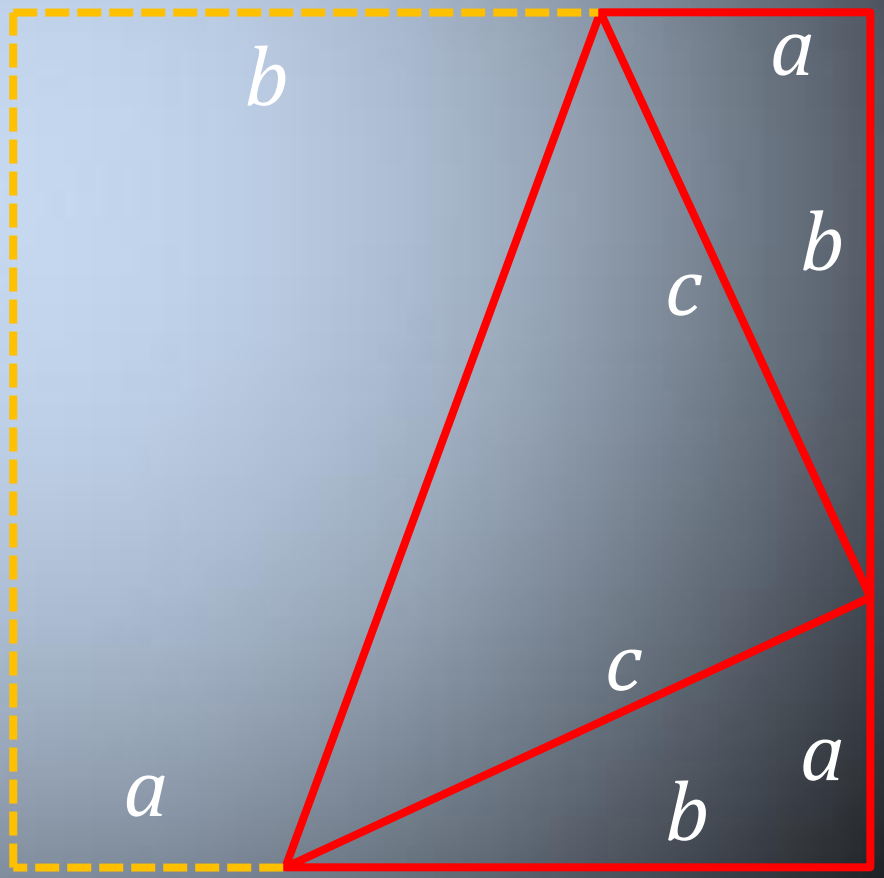
$$½(a+b)(a+b) = ½\,(ab)+½\,(ab)+½\,(cc)$$

thus

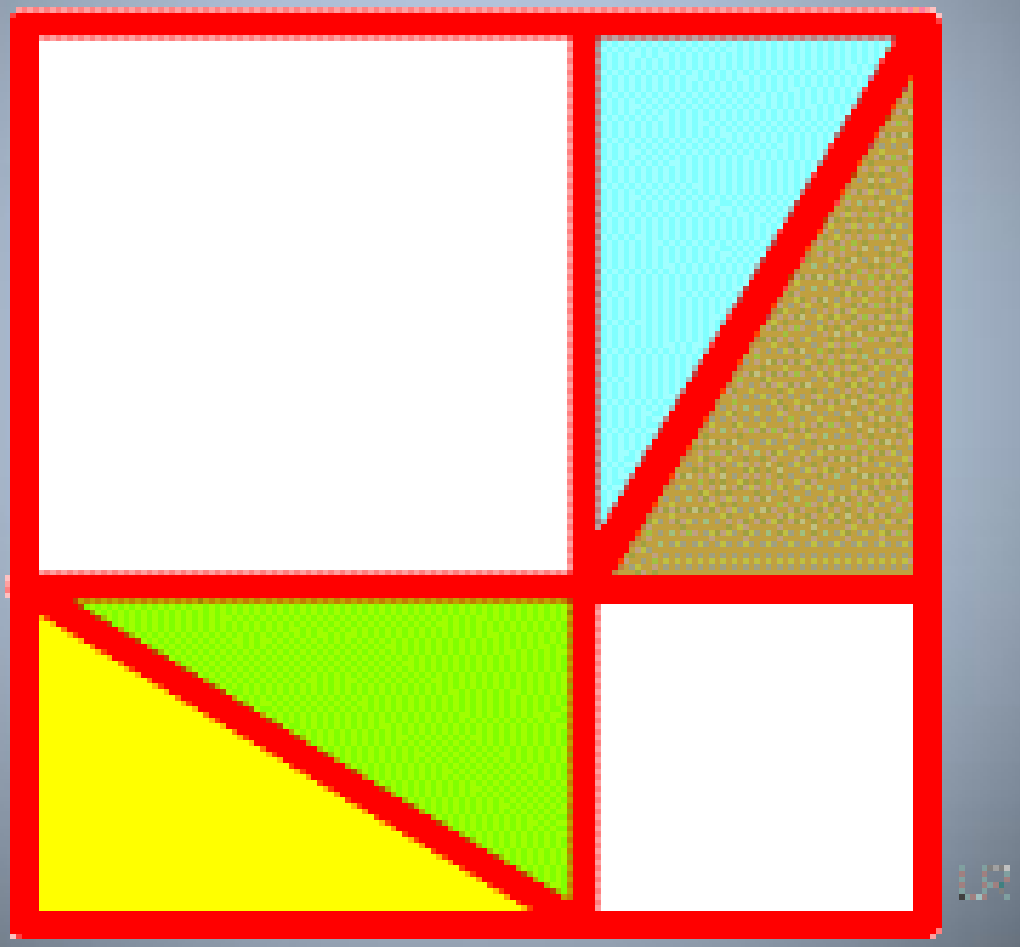
$$a^2+2ab+b^2 = 2ab+c^2$$

hence

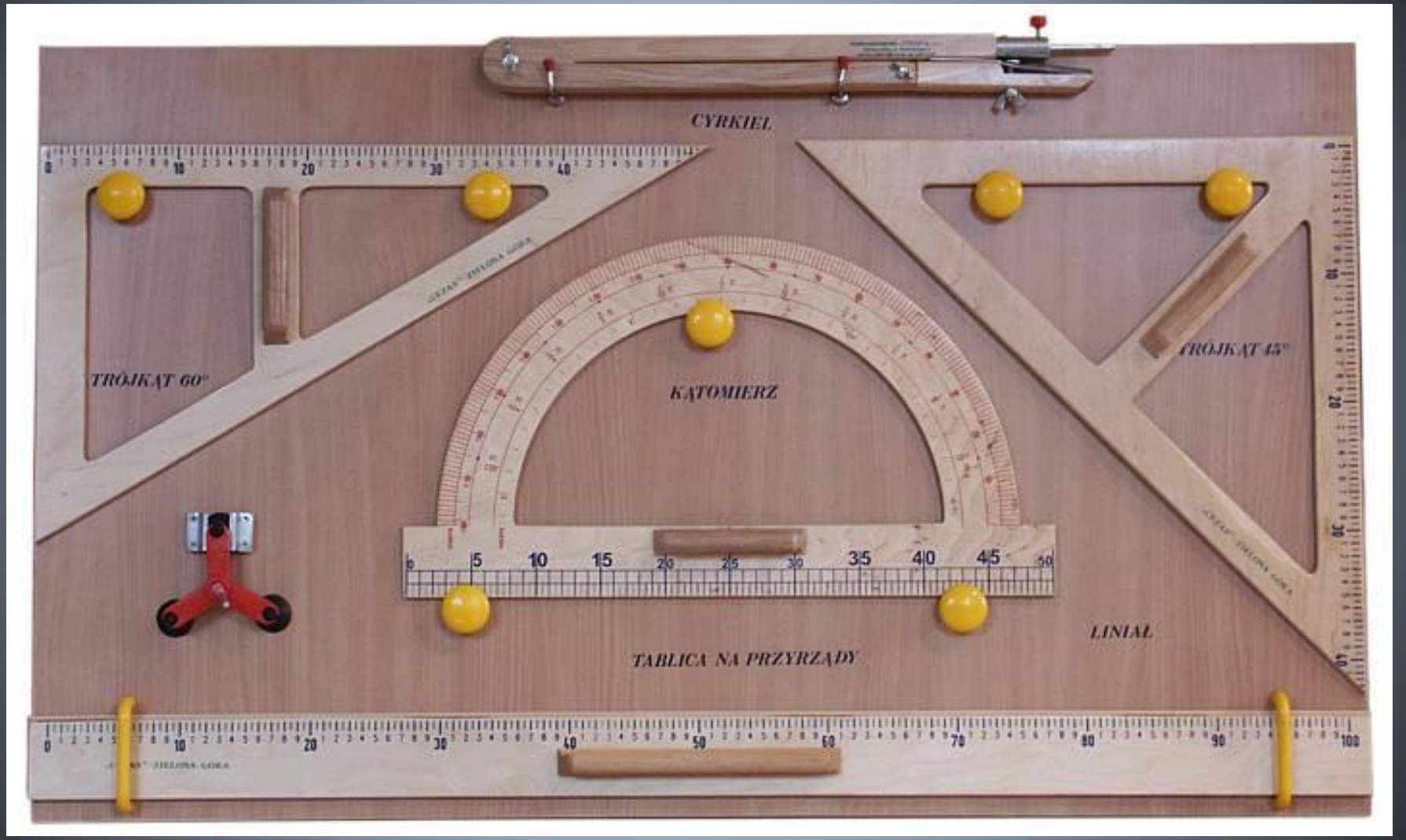
$$a^2+b^2=c^2$$



Multimedia Proof (200 b.c.)



MATHEMATICAL TOOLS


CYRKIEL
TRÓJKĄT 60°
KĄTOMIERZ
TRÓJKĄT 45°
LINIAŁ
TABLICA NA PRZYRZĄDY

WolframAlpha™ computational... knowledge engine

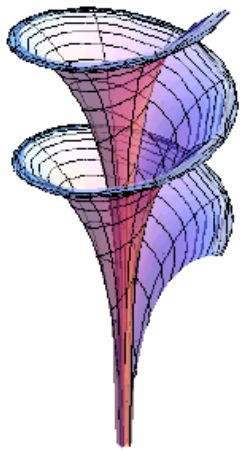
Dini's surface

Input interpretation:

Dini's surface (surface)

Example plot: More examples

$a = 1, b = 0.2$



Properties:

New to Wolfram|Alpha?

A few things to try:

- enter any date (e.g. a birth date)
  june 23, 1988
- enter any city (e.g. a home town)
  new york
- enter any two stocks
  IBM Apple
- enter any calculation
  $250 + 15%
- enter any math formula
  x^2 sin(x)

more »

Examples by Topic »

Visual Gallery of Examples »

Watch Overview Video »

Related Links

Dini's Surface (Wolfram MathWorld)
A surface of constant negative curvature obtained by twisting a pseudosphere and ...

Search the Web

Dini's surface

Internet | Tryb chroniony: włączony

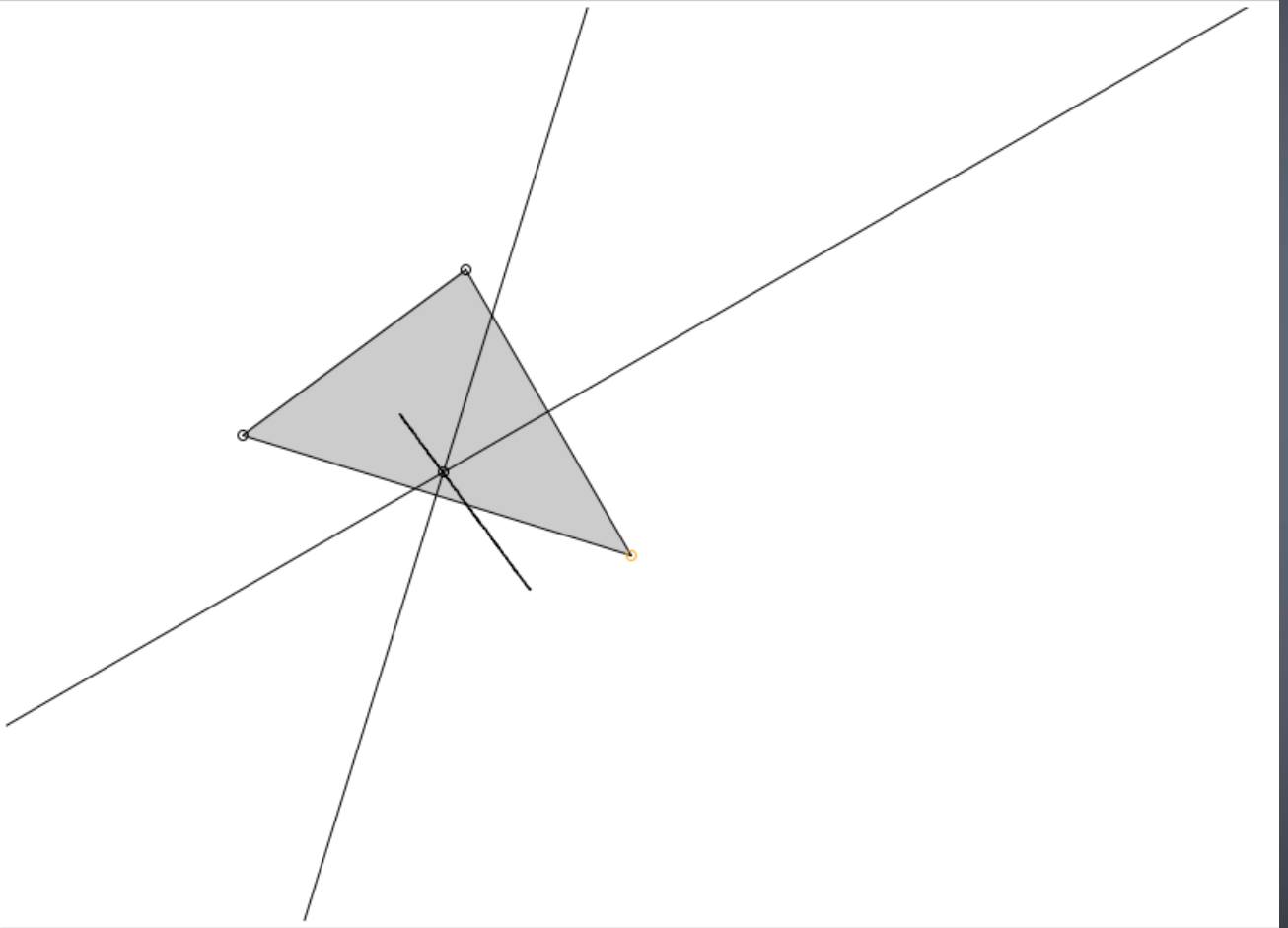
100%

C.a.R.

Plik Akcje Opcje Settings Makroprogramy Specjalne Pomoc

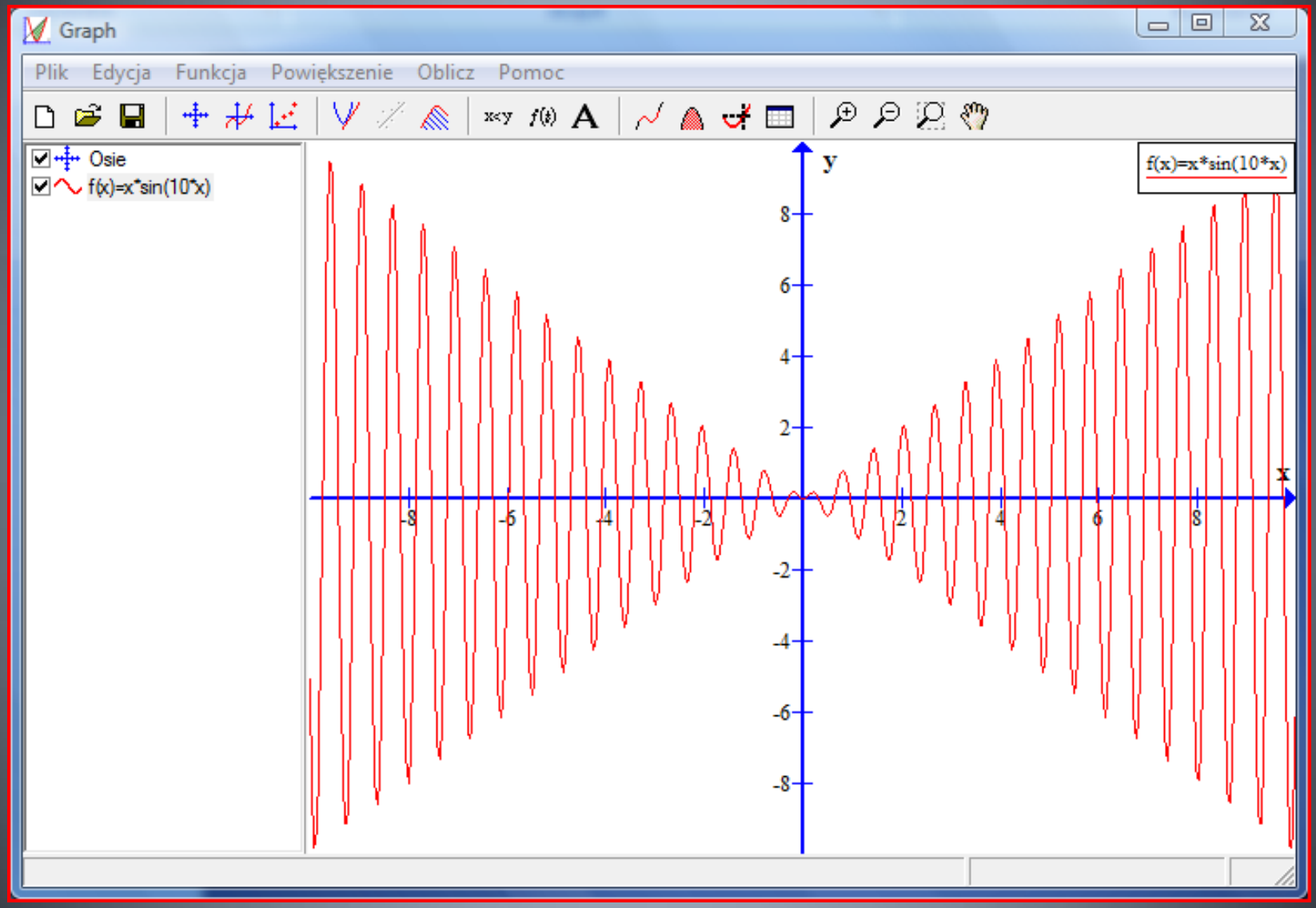
All Objects ?

> P1 : Punkt na współrzędn
> P2 : Punkt na współrzędn
> P3 : Punkt na współrzędn
> poly1 : Wielokąt P1, P2,
l2 : Prosta przechodząca p
l3 : Prosta przechodząca p
I5 : Punkt przecięcia l2 i



Ślad: Punkt do przesunięcia (Shift: więcej)?

Wszystkie ze ... CBLIS 2010 Microsoft Po... Słownik pols... Dini's surfac...


Graph
Plik Edycja Funkcja Powiększenie Oblicz Pomoc
Osie
f(x)=x*sin(10*x)
f(x)=x*sin(10*x)
y
x
8
6
4
2
-2
-4
-6
-8
-8
-6
-4
-2
2
4
6
8

OpenOffice.org™

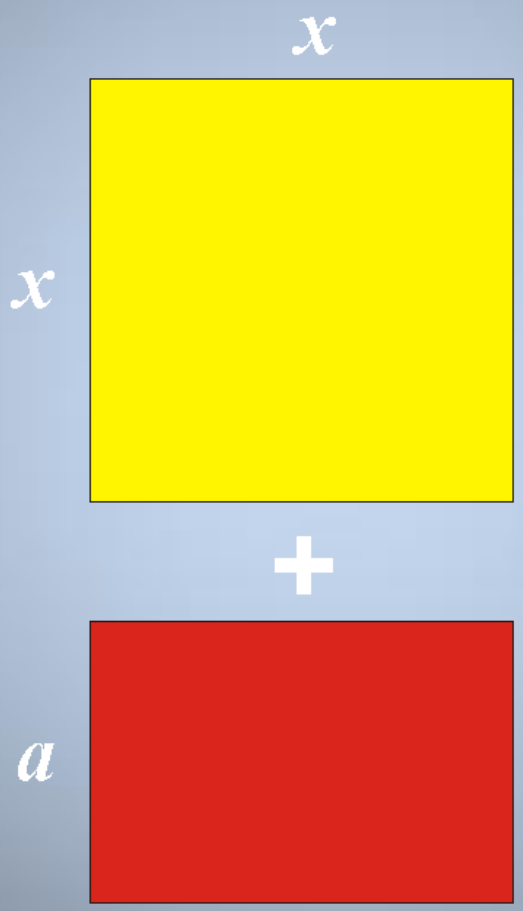
Microsoft®
Office

Presentation software

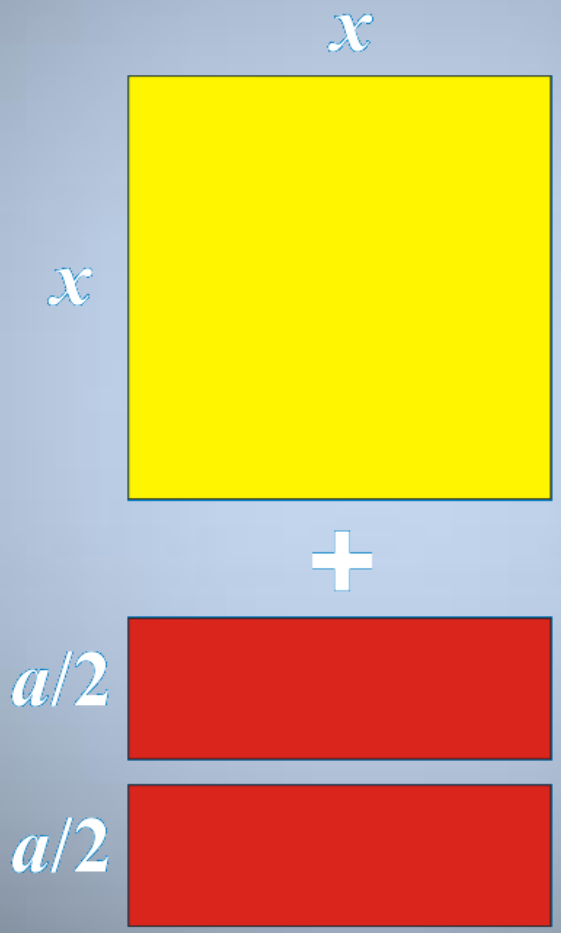
Completing the square

$$x^2 + ax + ? = (\ldots)^2$$

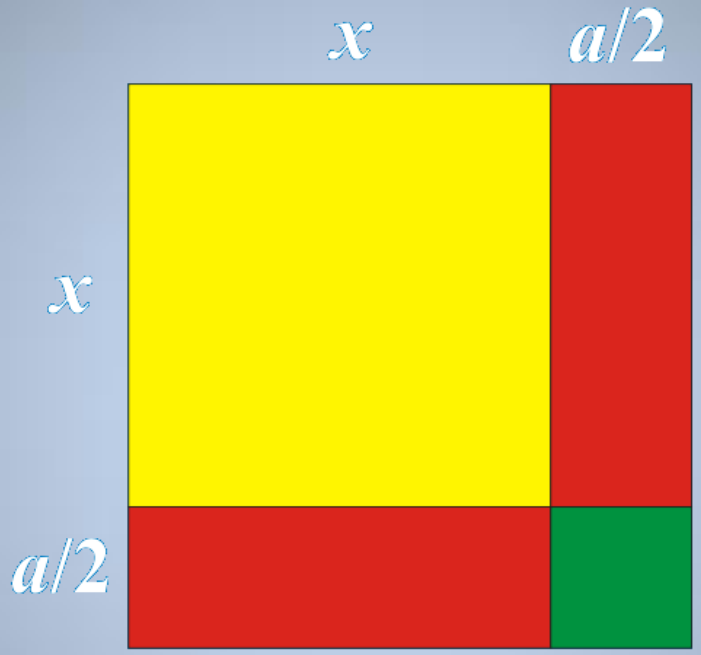
Completing the square



Completing the square



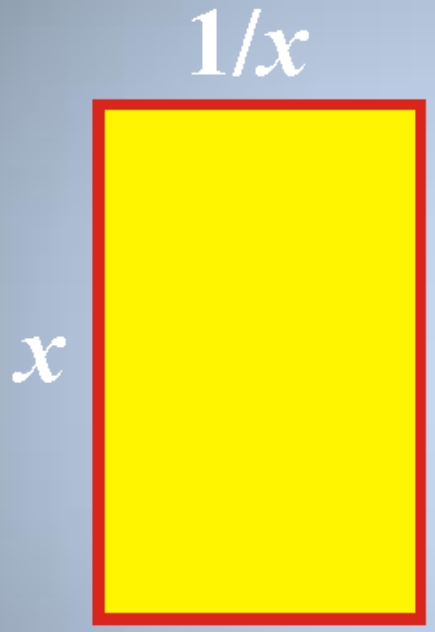
Completing the square



Number and its reciprocal

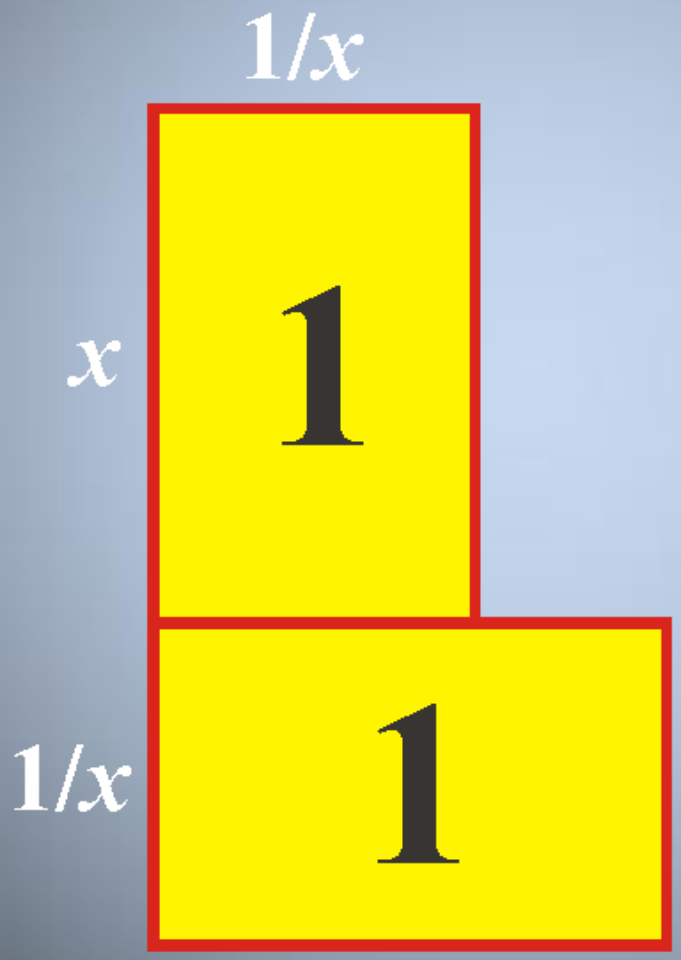
$$x + \frac{1}{x} \geq 2 \quad \text{for} \quad x > 0$$

Number and its reciprocal

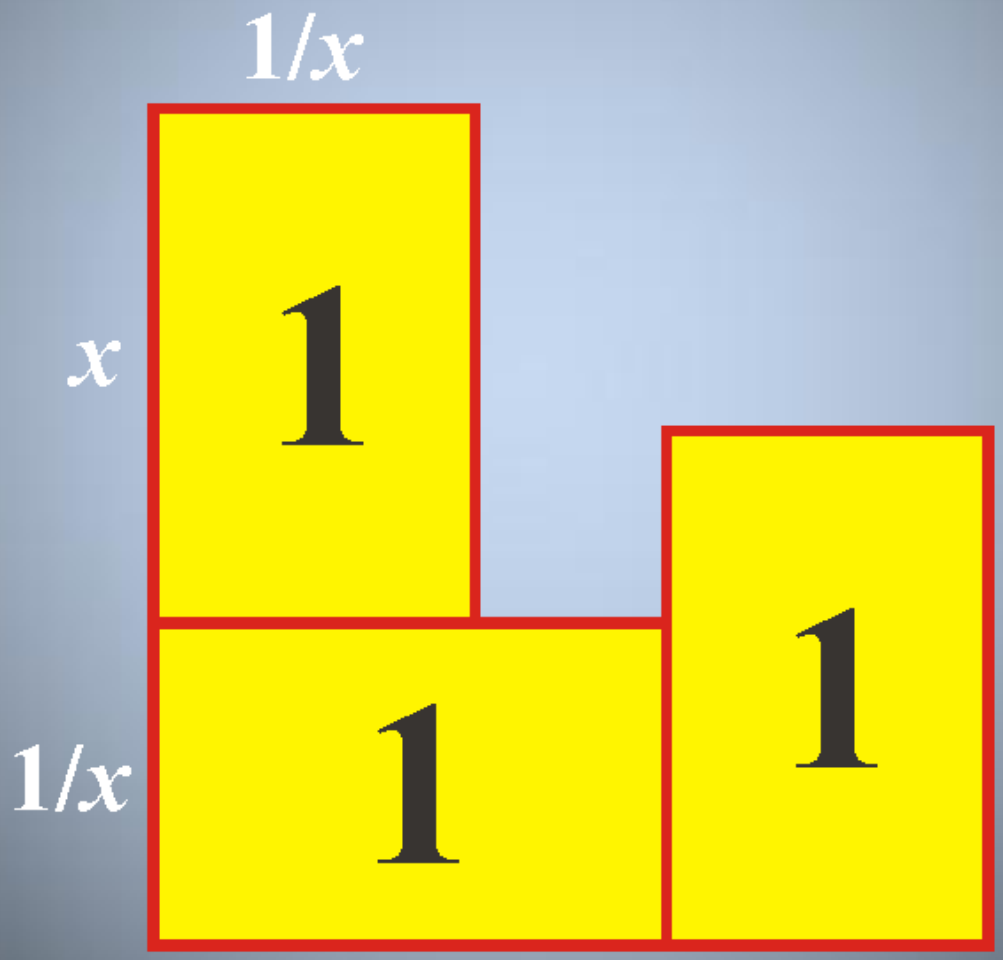


Number and its reciprocal

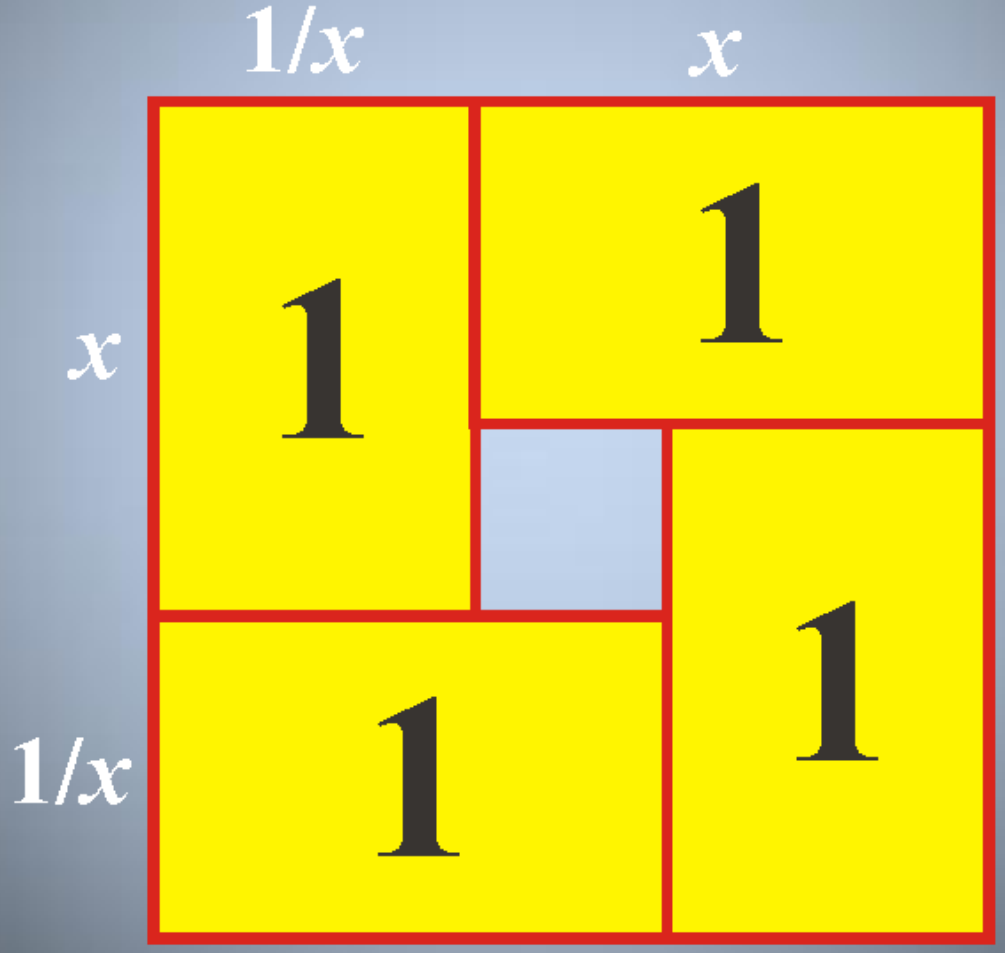
Number and its reciprocal



Number and its reciprocal



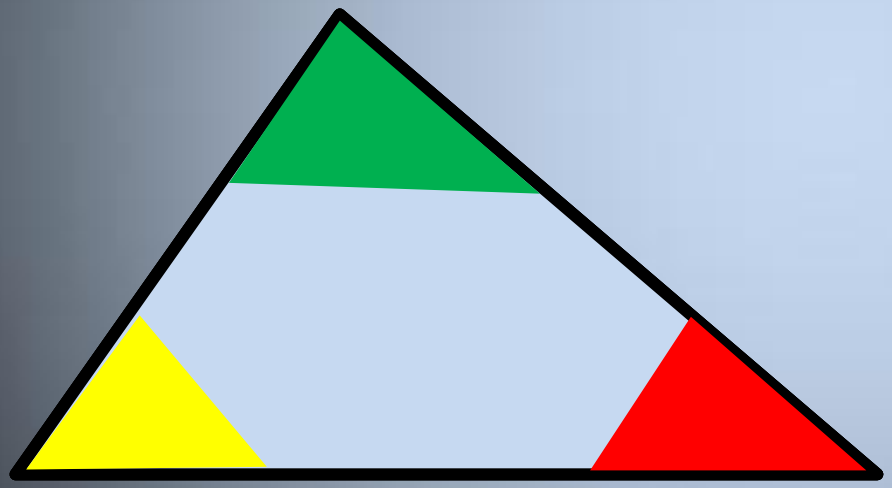
Number and its reciprocal



Triangle properties

The sum of the three angles inside any triangle always add up to 180 degrees.

Triangle properties



Vector graphics
In
Presentation software

Area of a figure

Word processor

Word processor

- sets,
- combinatorics,
- divisibility

Spreadsheet

Spreadsheet

- sequences
- models of mathematical objects

References

- Roger B. Nelsen, Proofs without Words, Washington DC: 1993
- Walter W. Sawyer, Vision in Elementary Mathematics, Middlesex: 1964
- Stephen Barnett, Discreet Mathematics, Numbers and Beyond, Essex: 1998
- David Green, Peter Armstrong and Richard Bridges, Spreadsheets: Exploring their Potential in Secondary Mathematics, Leicester: 1993
- http://en.wikipedia.org/wiki/Microsoft_Office
- http://en.wikipedia.org/wiki/Open_Office

Leszek Rudak
l.rudak@uw.edu.pl