riscalamento e dimensione

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Aperitivo

Problema

Il Sig. Rossi ha ordinato un aperitivo in un bicchiere a forma di cono.
Dopo averne offerto un sorso alla moglie vede che il livello del liquore si è dimezzato.
Quale frazione di liquore gli è rimasta da bere?



Tuberine

Problema

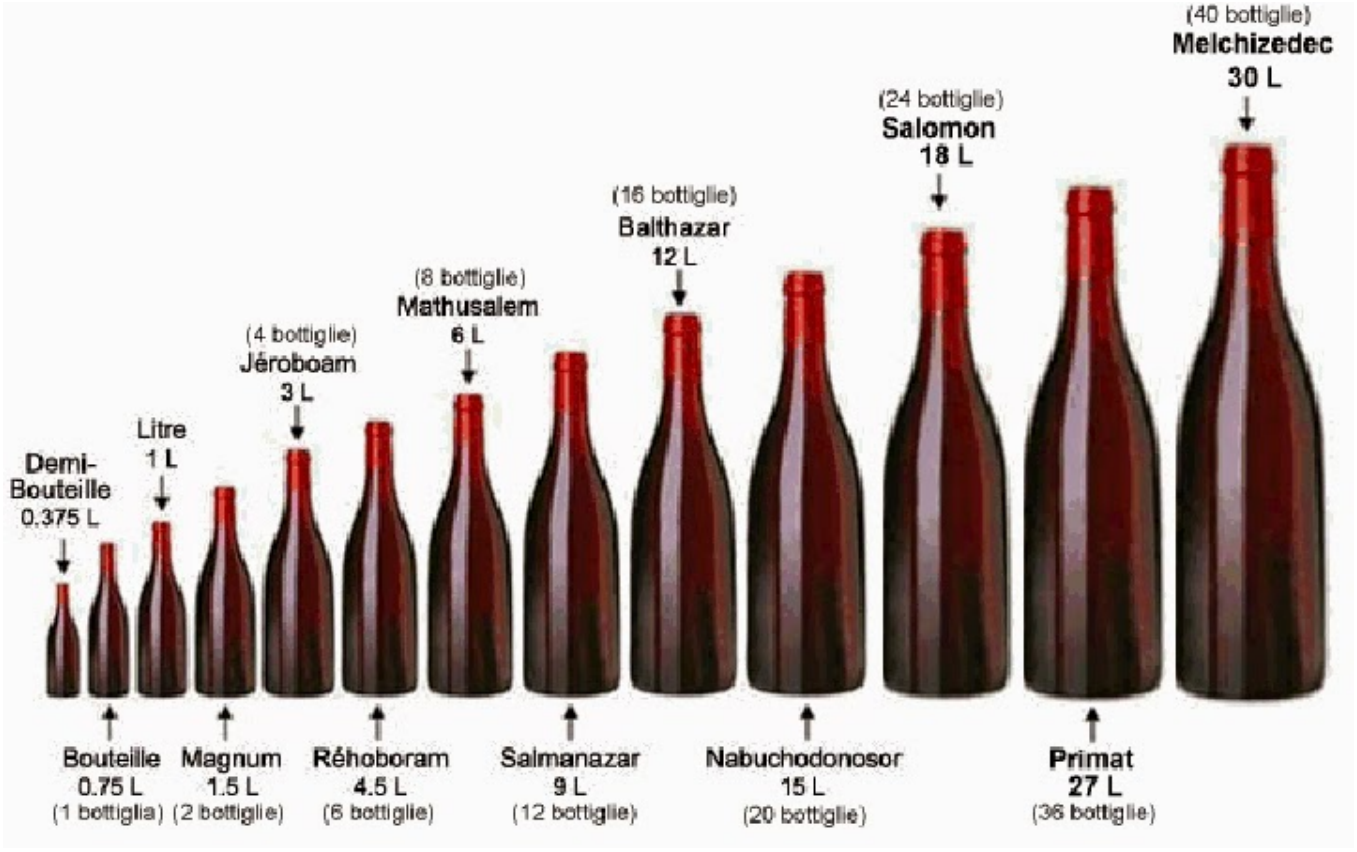
Le “tuberine” vengono normalmente confezionate in un cilindro di altezza 18cm e diametro 9cm. Una confezione contiene 50g di patatine. Se le patatine venissero confezionate in un cilindro di dimensioni doppie, quanti grammi di patatine ci aspetteremmo di trovare?



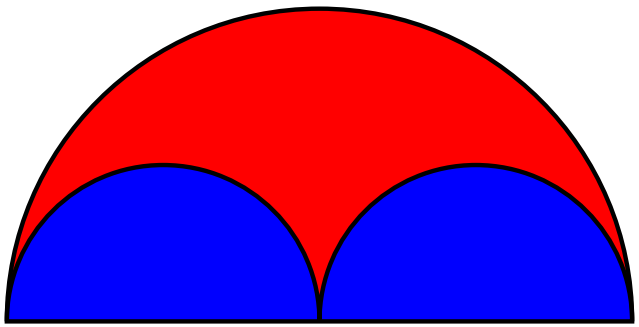
Bottiglia

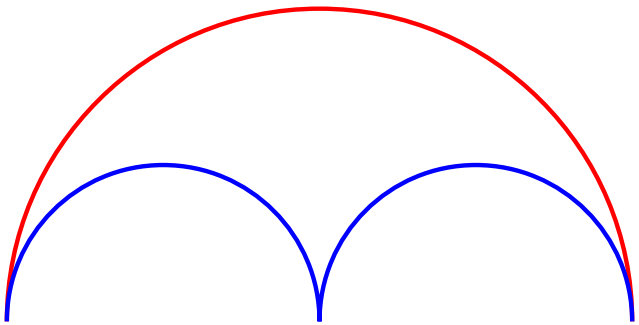
Problema

Una normale bottiglia di vino ha una capacità di 3/4 *di litro. Una bottiglia di tipo* Jéroboam *contiene invece* 3 *litri. Quanto è il rapporto tra le altezze delle due bottiglie?*



Area e lunghezza



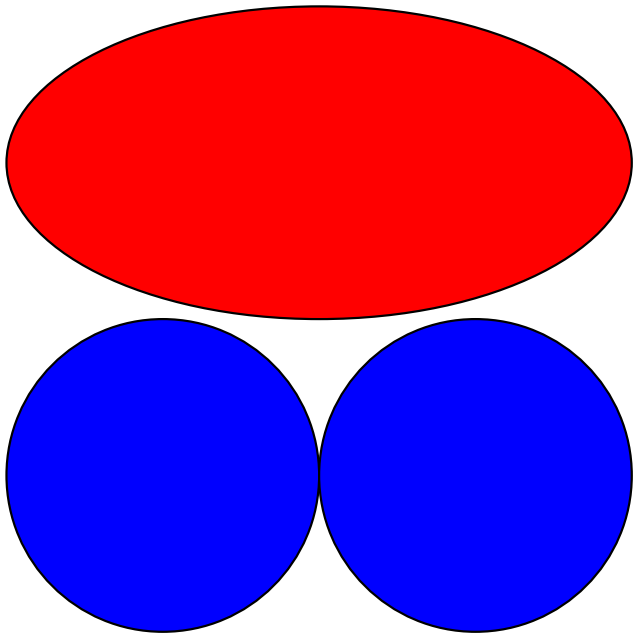


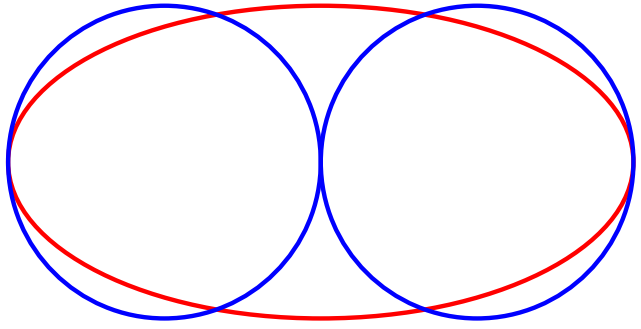
Problema

È maggiore l'area rossa o l'area blu?

È più lunga la curva rossa o la curva blu?

Attenzione!



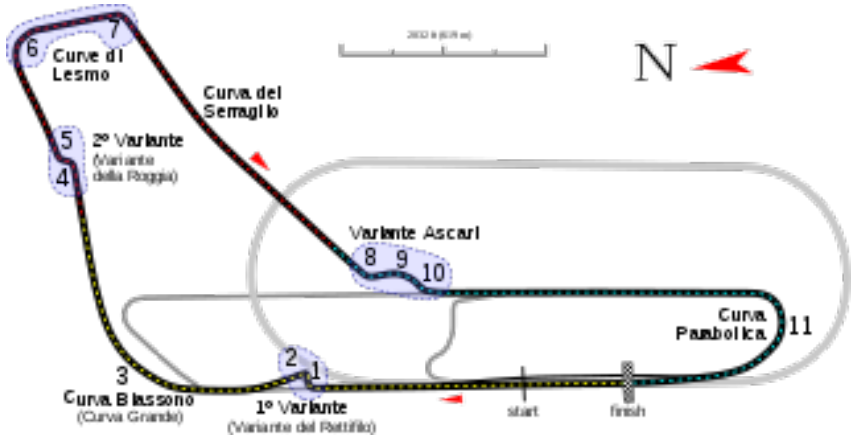


Problema

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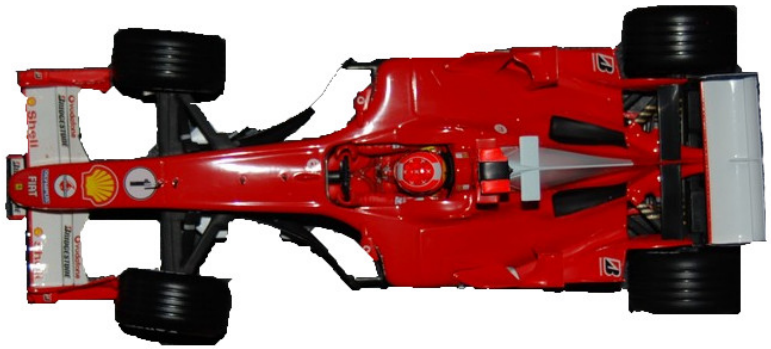
Lunghezza



Problema

Daniele ha disegnato il circuito di Monza in scala 1:1000 sul pavimento della terrazza. Se il circuito vero è lungo 5 Km, quanto sarà lungo il circuito in scala?

Superficie



Problema

Le macchinine che Daniele usa per giocare sono invece in scala 1 : 50*. Se per dipingere la macchinina Daniele utilizza 1 tubetto di vernice rossa, quanti tubetti gli sarebbero necessari per dipingere la macchina vera?*

Omino di cera



Problema

Usando un litro di cera modello un omino che raffigura me stesso. Quanto verrà alto l'omino?

Formato ISO 216

Problema

Quali sono le dimensioni di un foglio A4?

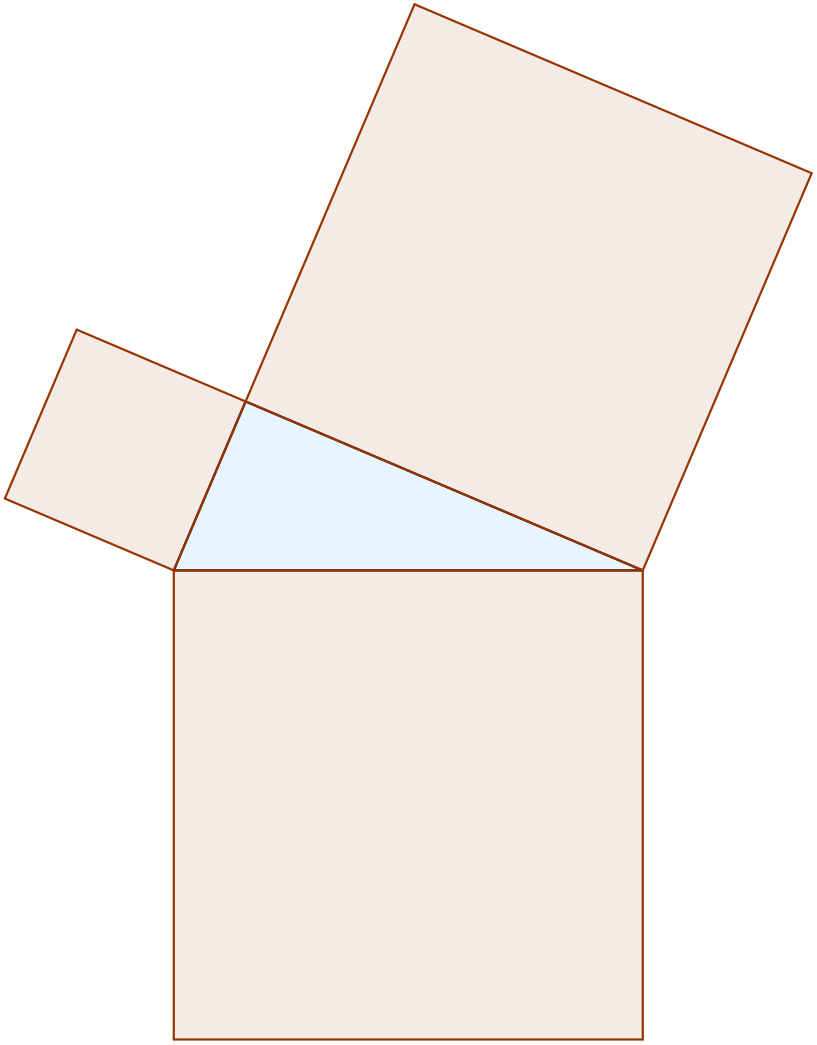
misura 0-dimensionale



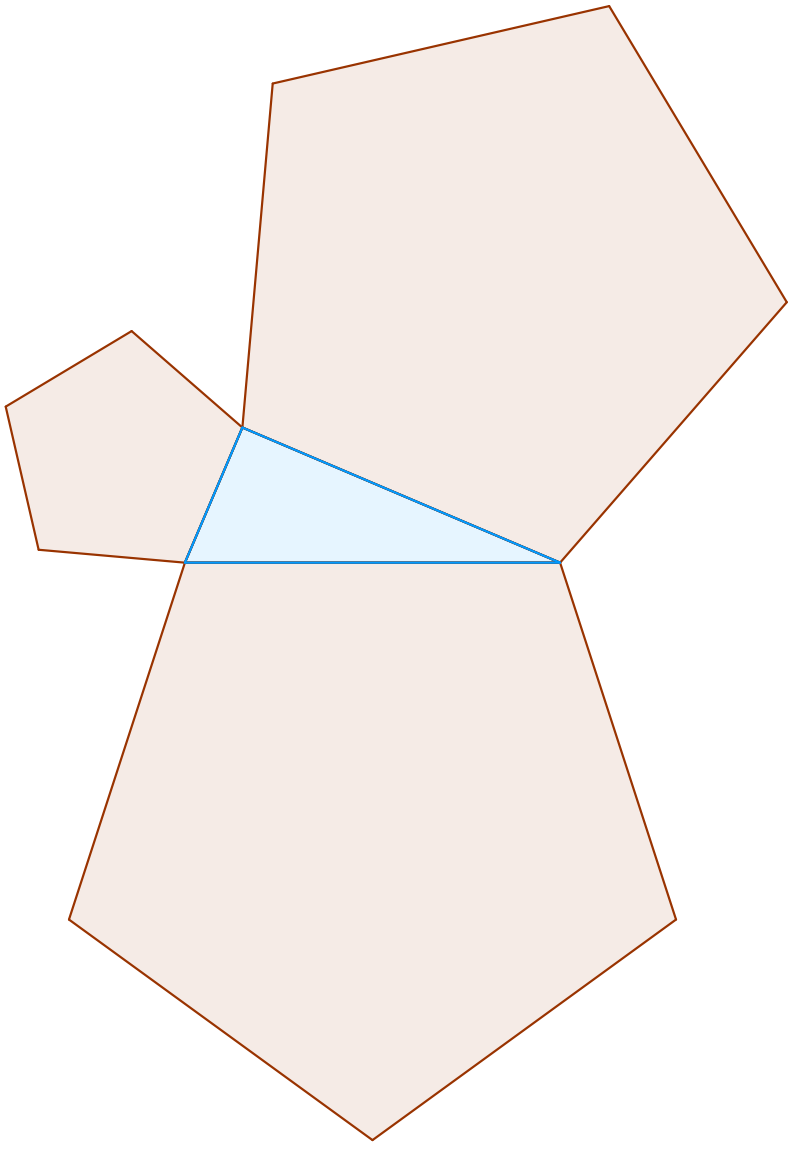
Problema

In una foto di gruppo ci sono 26 persone.
La foto viene ingrandita per farne un poster. Quante persone ci sono nella foto ingrandita?

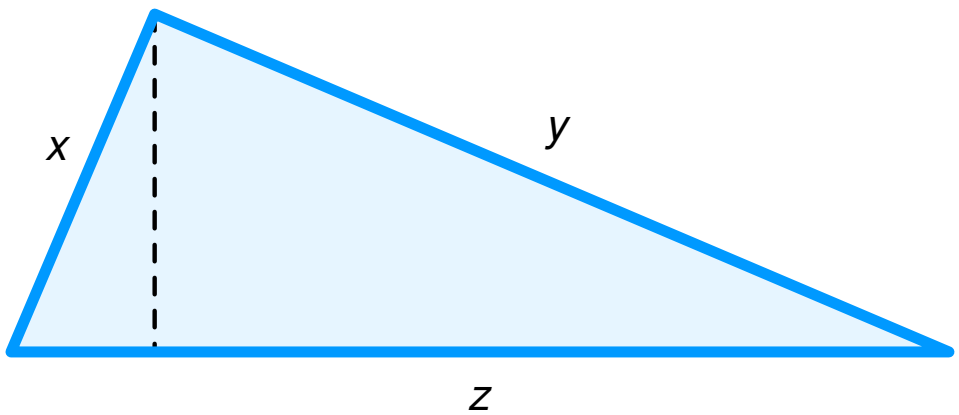
Il teorema di Pitagora



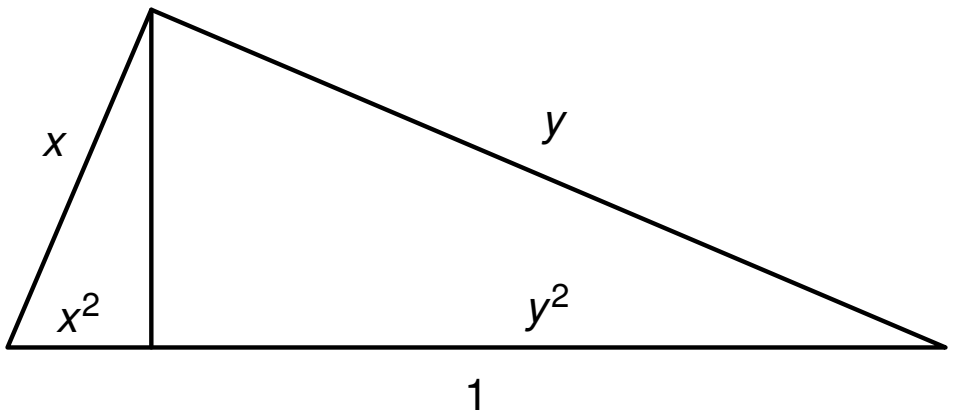
Il teorema di Pitagora



Teorema di Pitagora



Teorema di Pitagora



Allometria





Allometria

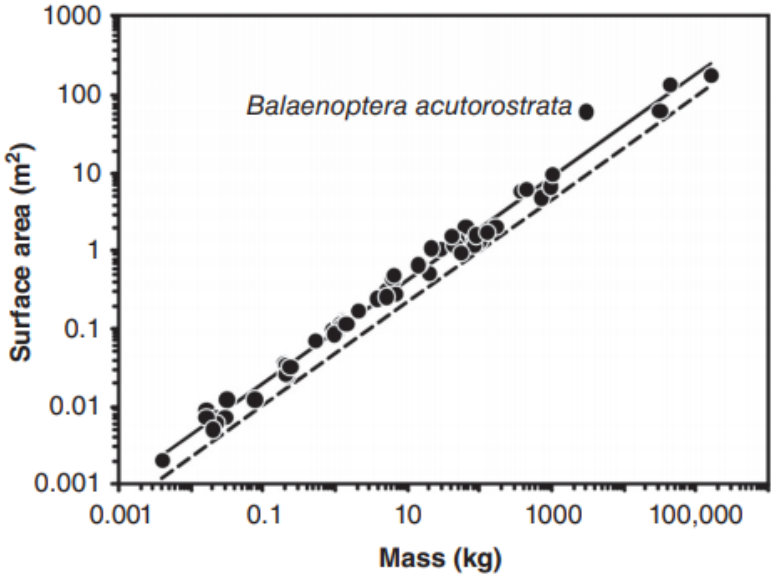


Figure 1 Scaling of surface area with body mass (*M*, kg) in mammals (data from 333). The solid line is the phylogenetically informed scaling relationship (surface area = 0.092 $M^{0.67}$) (333). The lower dashed line is the relationship between the surface area and volume of a sphere with a density of 1.08 g cm^{-3}, a rough estimate of a mixture of muscle, fat, and bone: muscle has a density of 1.06 g cm^{-3}; bone has a density of 2.00 g cm^{-3}; and fat has a density of 0.93 g cm^{-3} (7).

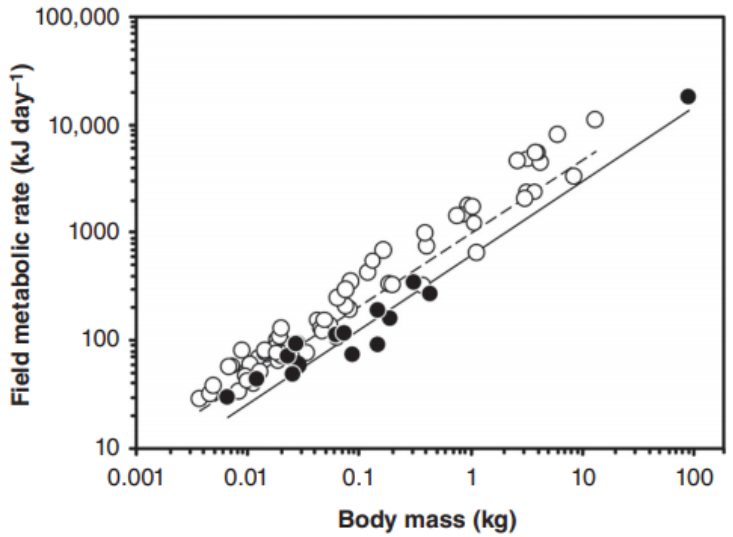


Figure 5 Scaling of field metabolic rate (FMR) with body mass (*M*) in arid (filled symbols, solid line) and nonarid (unfilled symbols, dashed line) birds (data from 405). Phylogenetically informed relationships: arid birds, FMR = 5.24 (2.86-9.59) $M^{0.691\ (0.610\text{-}0.772)}$; non-arid birds, FMR = 9.31 (7.79-11.12) $M^{0.676\ (0.383\text{-}0.969)}$; values in parentheses are 95% confidence limits. Analyzed using independent contrasts (110), the scaling exponent of FMR does not differ among arid and non-arid birds ($t = -1.57$, $P = 0.12$), whereas environment (desert or non-desert) does have a significant effect ($t = 2.11$, $P < 0.04$) (405).

*

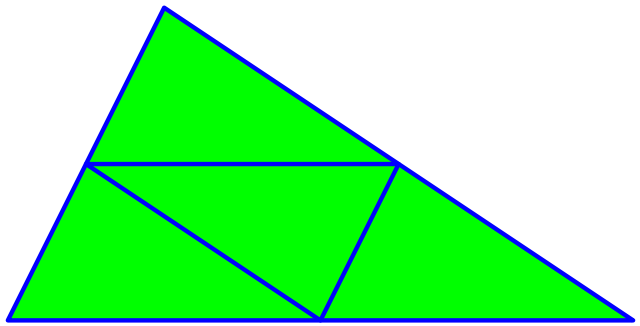
*Craig R. White and Michael R. Kearney, *Comprehensive Physiology* (2016)

figure autosimilari

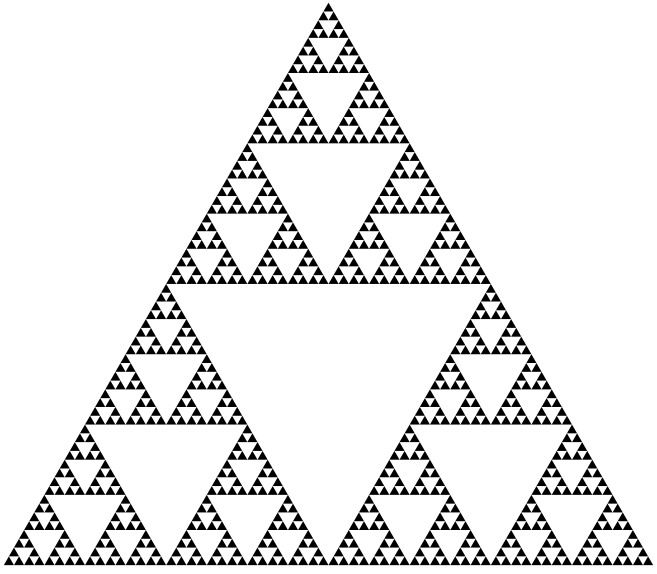
Problema

Fare un esempio di figura invariante per omotetia.

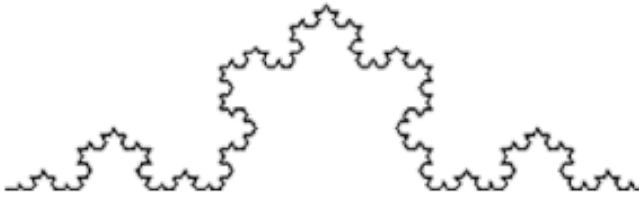
figure decomponibili in copie simili



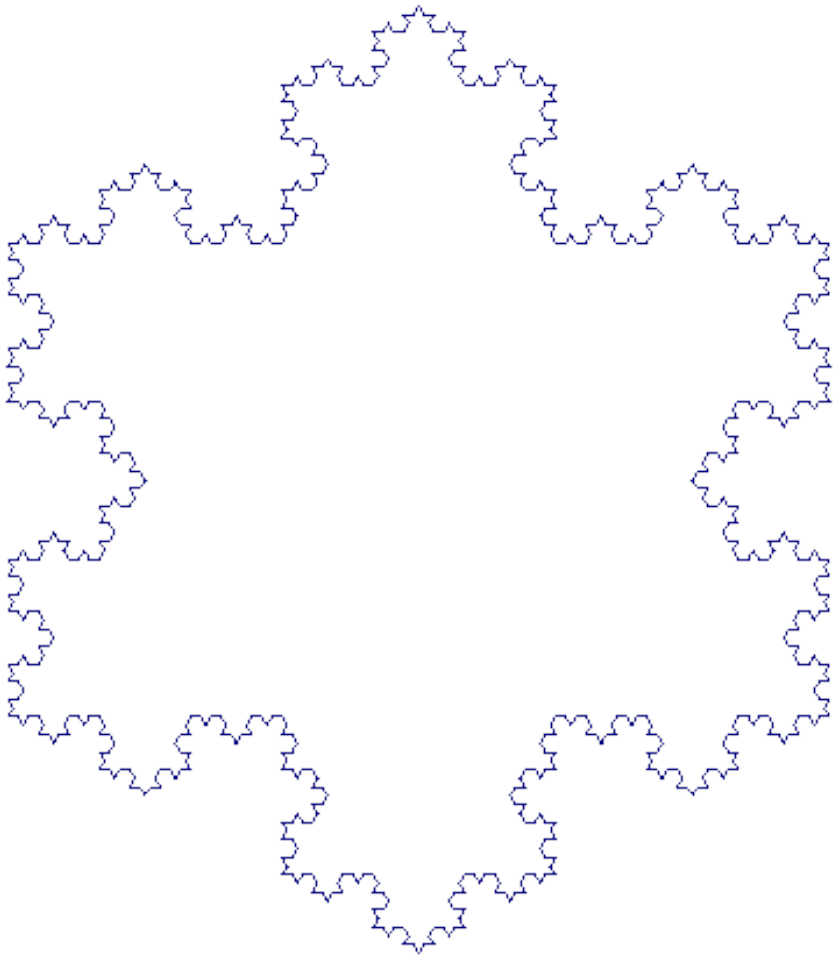
Triangolo di Sierpinksi



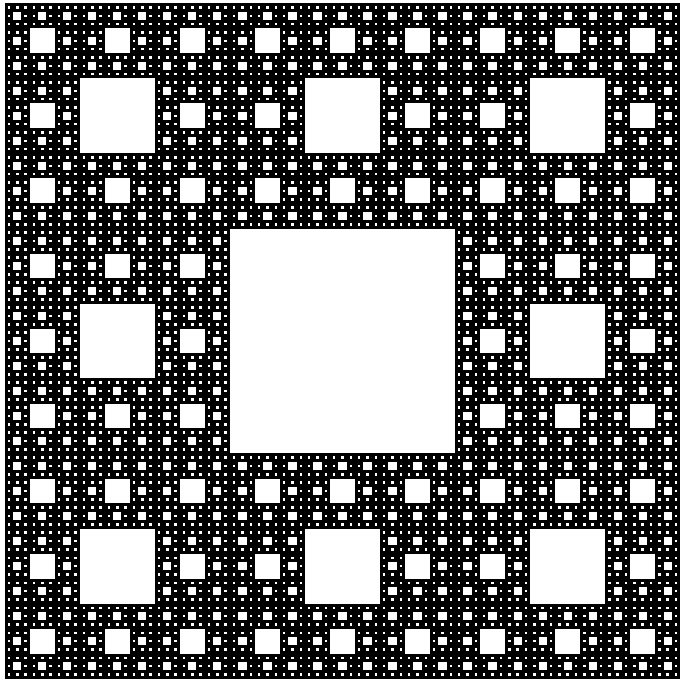
La curva di Koch



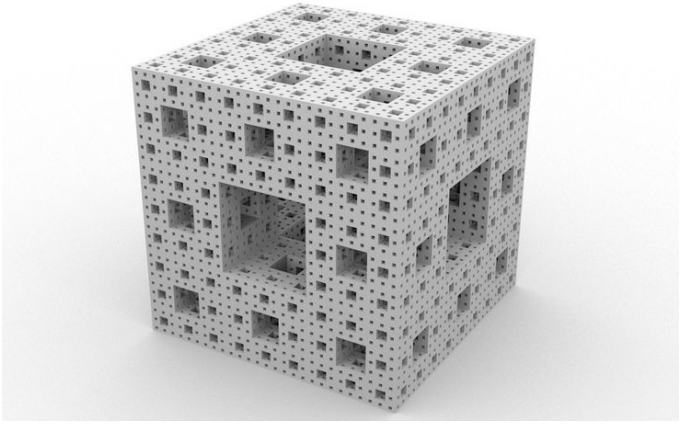
Fiocco di neve



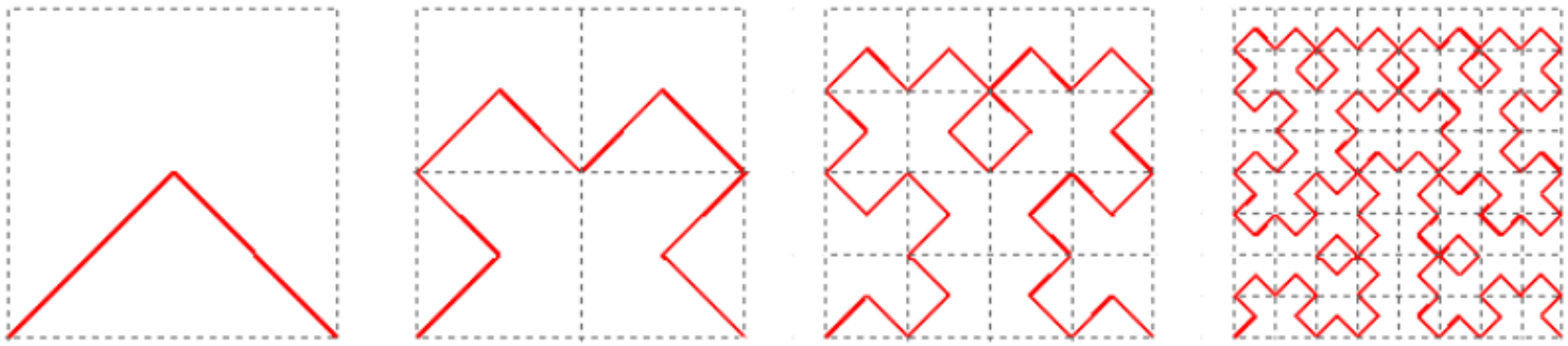
Tappeto di Sierpinksi



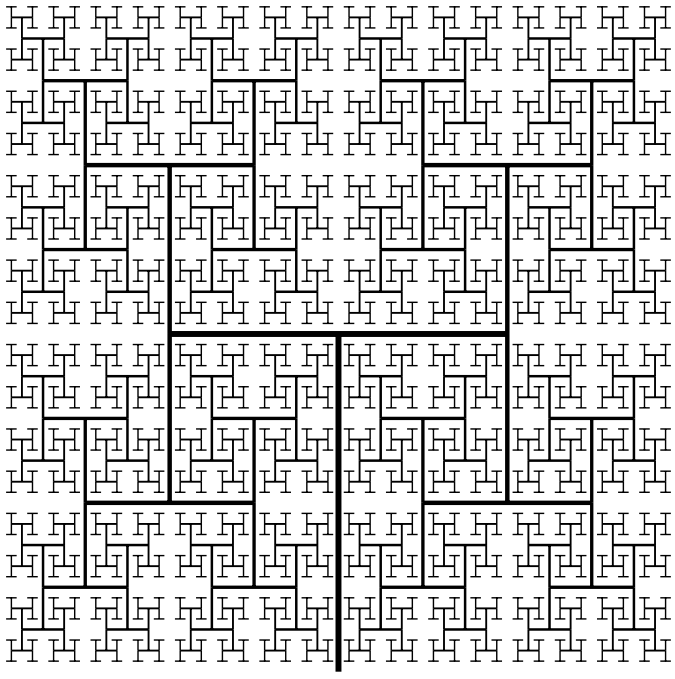
Spugna di Menger



Curva di Peano

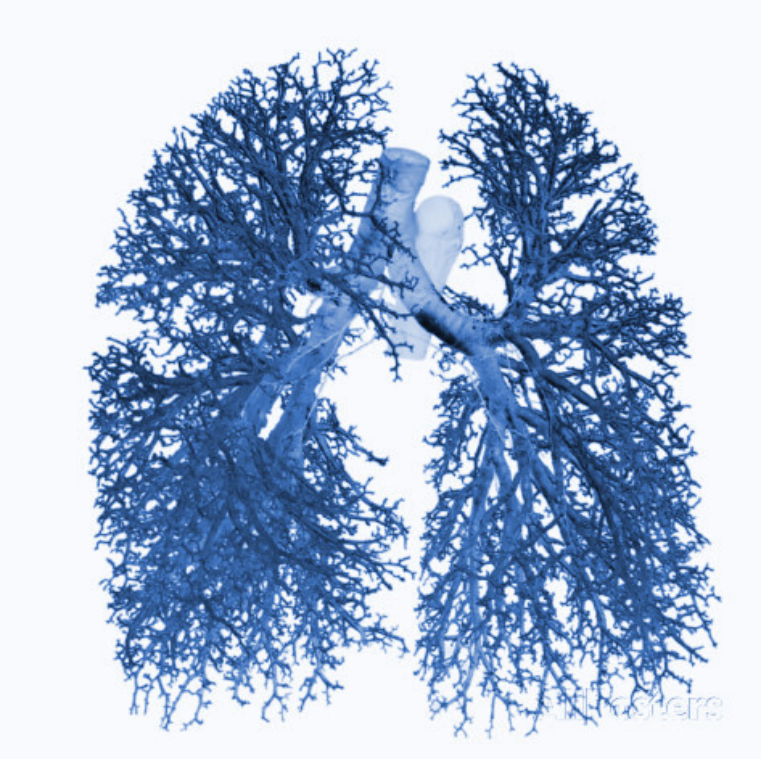


Antenna frattale

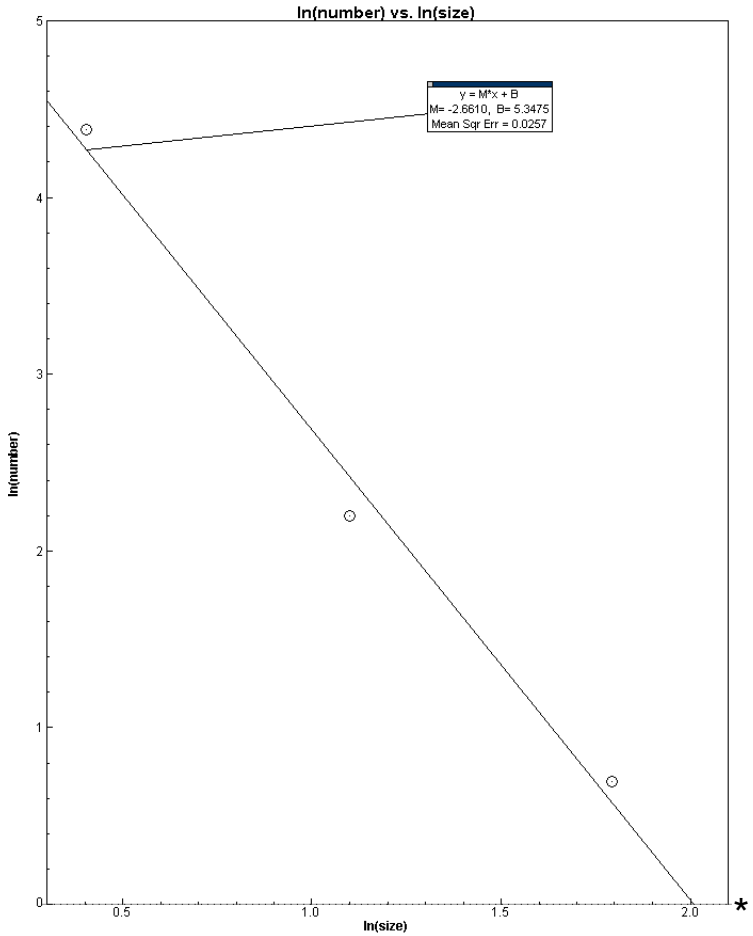


Frattali in natura



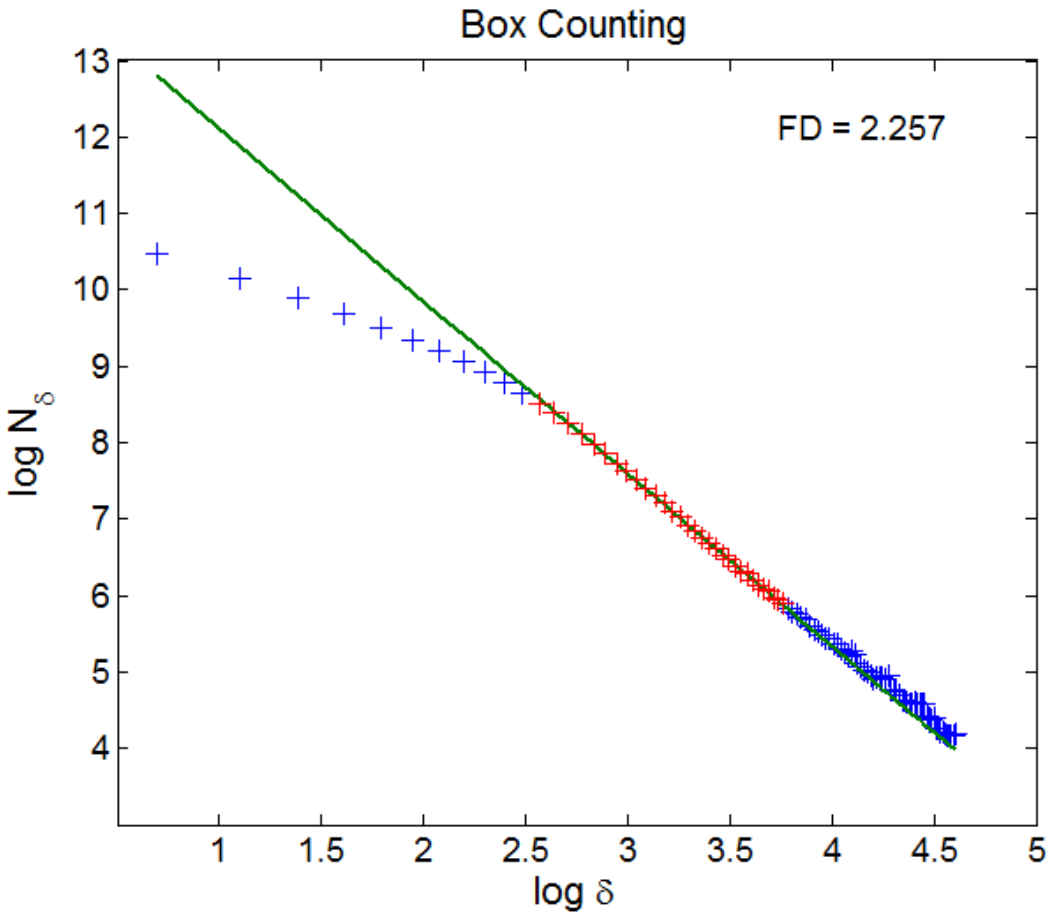


Logaritmo di broccolo



*A. Kapelner, V. Schupack, M. Golomshtok, J. Alicea *The Physics Factbook* (2002)

Box-counting: polmone



*

*M. Helmberger, M. Pienn et al. *Plos One* (2014)