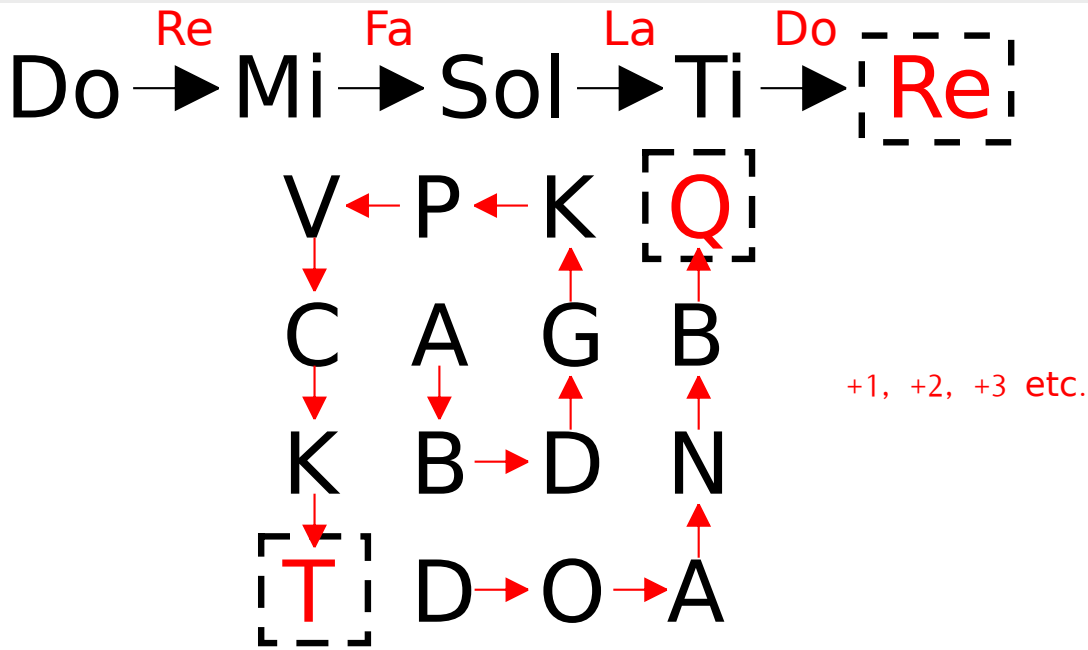


EMAG 2012 Brain Challenge

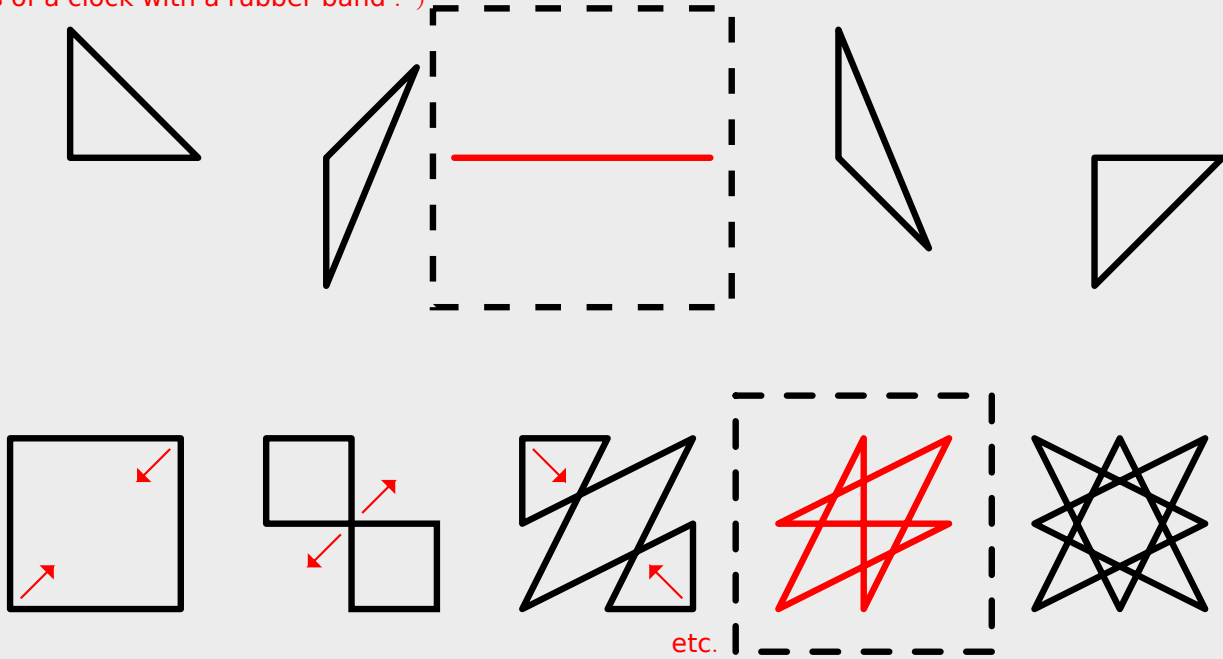
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Clock arithmetic

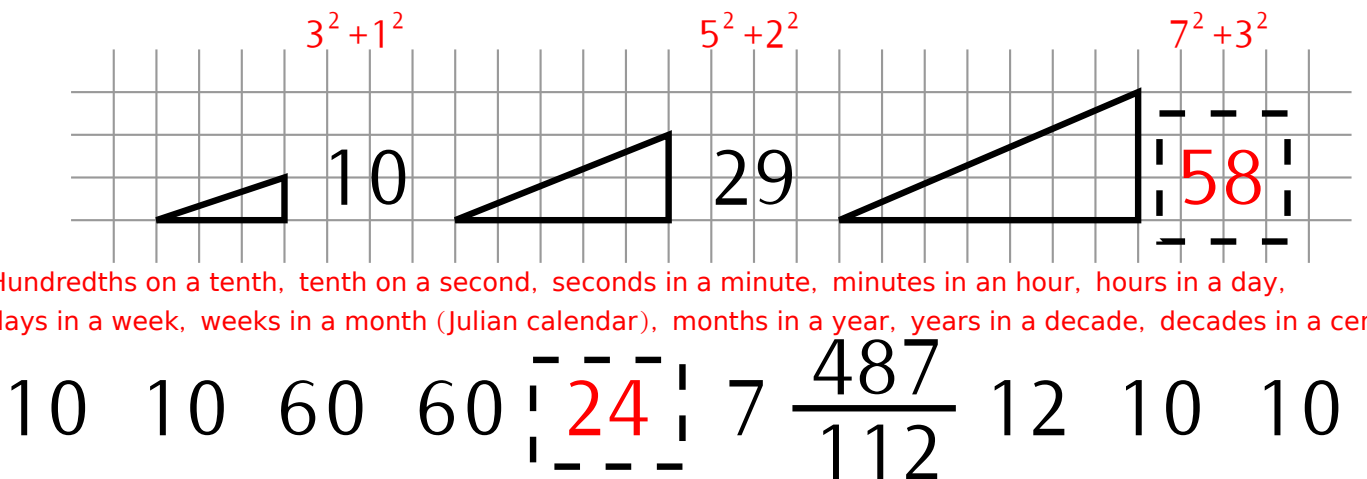


Two hands of a clock with a rubber band :-)

2-D transformations



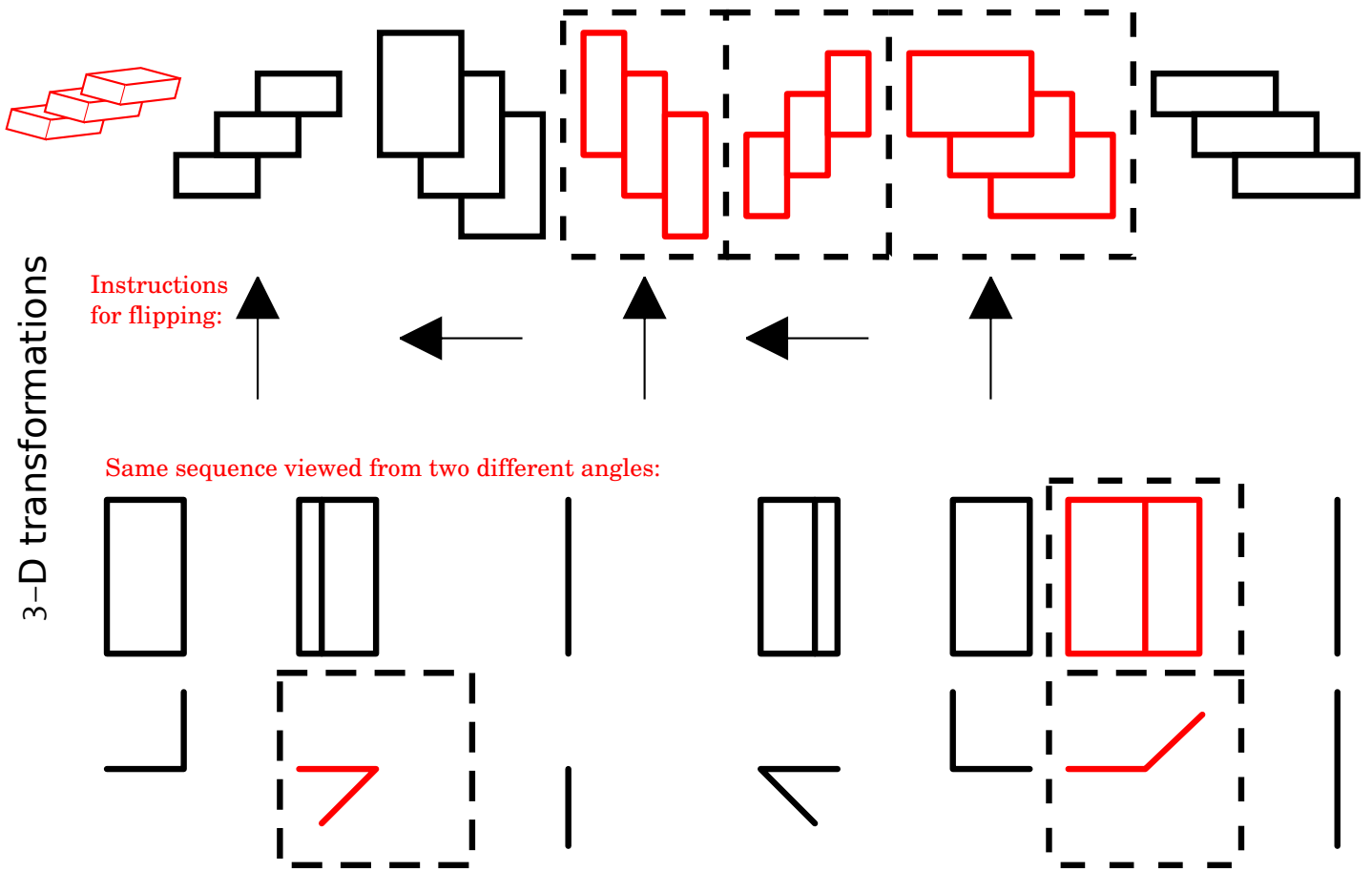
Numbers & associations



Hundredths on a tenth, tenth on a second, seconds in a minute, minutes in an hour, hours in a day, days in a week, weeks in a month (Julian calendar), months in a year, years in a decade, decades in a century.

EMAG 2012 Brain Challenge

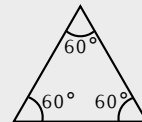
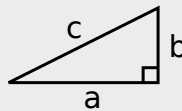
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Reminders

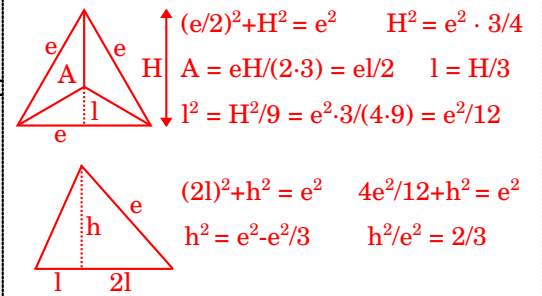
Circumference (C) of the circle (r = radius): $C = 2\pi r$

Pythagorean theorem: $a^2 + b^2 = c^2$



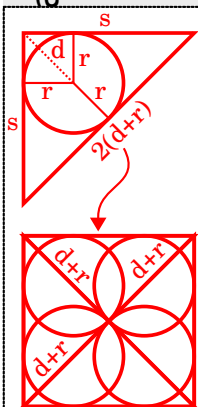
Equilateral triangle

What is the ratio between the height (h) pyramid that consists of four equilateral triangles



$$\frac{h}{e} = \sqrt{\frac{2}{3}}$$

and geometry



$$C_c = 2\pi r \quad C_t = 2(d+r) + 2s$$

$$d^2 = 2r \quad d = \sqrt{2}r \quad d+r = \sqrt{2}r + r$$

$$s^2 = 2(d+r)^2 \quad s = \sqrt{2}(d+r) = 2r + \sqrt{2}r$$

$$C_t = 2(\sqrt{2}r + r) + 2(2r + \sqrt{2}r) = 4\sqrt{2}r + 6r$$

$$\frac{C_c}{C_o} = \frac{2\pi r}{4\sqrt{2}r + 6r} = \frac{\pi}{2\sqrt{2} + 3}$$

ratio between the circumference of the circle and
perimeter of the triangle?

$$\frac{\pi}{3 + \sqrt{8}}$$