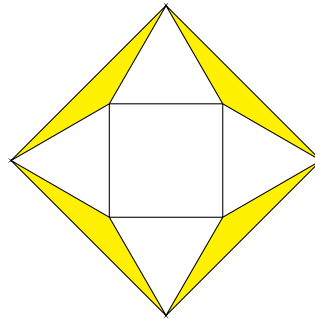




Problems

1. How many sequences of 0s, 1s and 2s can be made consisting of exactly five 0s, three 1s and two 2s?
2. Four equilateral triangles are arranged around a square as shown. Is the shaded area greater or lesser (or equal to) the area of the inner square?



3. What is the sum of the reciprocals of all the factors of 120.
4. Let a, b, c be any three positive real numbers. Prove that

$$\frac{a}{b} + \frac{b}{c} + \frac{c}{a} \geq 3.$$

5. Let m and n be any two positive integers. Show that $m^9n^3 - m^3n^9$ is divisible by 504.
6. A standard pack of cards is thrown into the air in such a way that each card, independently, is equally likely to land face up or face down. The total value of the cards which landed face up is then calculated. (Card values are assigned as follows: Ace = 1, 2 = 2, ..., 10 = 10, Jack = 11, Queen = 12, King = 13. There are no jokers.) What is the probability that the total value is divisible by 13?