2-1.

Each of the small circles in the figure has radius 1. The innermost circle is tangent to the six circles that surround it, and each of those circles is tangent to the large circle and to its small-circle neighbors. Find the area of the shaded region.

2-2.   What is the numeric value of $cos^2 1° + cos^2 2° + cos^2 3° + \cdots + cos^2 90°$?

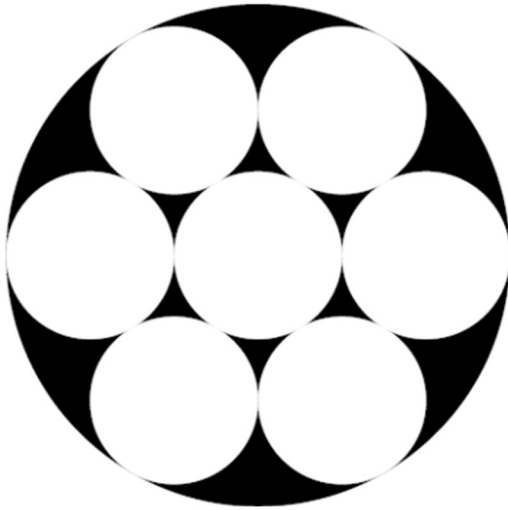**Bergen County Math League**

NO Calculators

Good Luck to You

BCML

Good Luck to All

Contest #2   2022-2023   12 minutes   Questions 3 & 4

2-3.   The first term of a geometric progression is $x^{\frac{1}{3}}$, the third term is $x^{\frac{1}{2}}$, and the thirteenth term is x^k. Find the value of k, expressing your answer in simplest fractional form.

2-4.   If $AB = 10$ cm, find the number of square cm in the area of the planar region bounded by the locus of points 3 cm from $\overline{AB}$.

Bergen County Math

NO Calculators

Good Luck to You

BCML

Good Luck to All

Contest #2   2022-2023   12 minutes   Questions 5 & 6

2-5.   Line m has equation $3x + 4y = 12$. The line with equation $3x + 4y = k$ is 2 units from m. Find the two possible values of k.

2-6.   The greatest common divisor of two positive integers is $10 = (2)(5)$. Their least common multiple is $1260 = (2^2)(3^2)(5)(7)$. If one of the integers is $90 = (2)(3^2)(5)$, find the other integer.