Problem 1. The length of a rectangle is increased by 30% and its width is decreased by 20%. By what percentage does its area increase?
Problem 2. When two joggers run around a 1-mile oval track in the same direction, one passes the other every 30 minutes. When they run in opposite directions, they pass every 10 minutes. What is the speed of the slower jogger (in mph)?
Problem 3. What is the largest integer $n$ so that a regular $n$-gon with sidelength 1 will fit inside a circle of radius 1?
Problem 4. If you have 2 black socks and 3 green socks in a drawer, how many socks must you take out in order to be guaranteed a matching pair?
Problem 5. If you have 2 black socks and 3 green socks in a drawer, in the long run, what is the average number of socks you must take out in order to have a matching pair?
Problem 6. How many positive factors does the number 288 have (including 1 and 288)?
Problem 7. What is the sum of all the positive factors of 288 (including 1 and 288)?
Problem 8. The three middle circles in the figure have radius 1. What is the sum of the radii of the smallest and largest circles?
Problem 9. How many integers between 7 and 2007 inclusive are divisible by neither 3 nor 5?
Problem 10. What is the sum of the digits of $11^7$?