1. If $2a = 3b$, $9b = 12c$, and $a = 12$, then what is c?
2. Let $*(a, b, c) = \frac{a^2}{b} + \frac{b^2}{c} + \frac{c^2}{a}$. Compute $*(3, 1, 2)$.
3. Compute $1.1 \times 1.1 \times 1.1$.
4. How many real solutions are there to the equation $|8x + 1| = 17$? Note that $|a|$ denotes the distance from 0 to a on the number line.
5. A square's perimeter is equal to its area. What is its side length?
6. Compute $4 + 8 + 12 + 16 + \cdots + 100$.
7. A crowd is chanting "$B, C, A, B, C, A, B, C, A, \ldots$" over and over again. What is the 2013th letter they will say?
8. If AJ has 42 fish, while Soonho only has 3, how many fish should AJ give to Soonho so that AJ has exactly double the number of fish that Soonho has?
9. Compute $12^3 - 3 \cdot 12^2 + 3 \cdot 12 - 1$.
10. October 13th, 2013 is a Sunday. What is the next year that October 13th will be a Sunday?
11. Kelvin finds \$10. He says that he now has 3 times as much money as he would have if he lost \$10. How much money did he originally have?
12. Container A is a cone, and Container B is a cylinder. They have the same radius and height. How many times more water can Container B hold than Container A?
13. The first term of a geometric sequence is 81, and the fourth term is 24. What is the sixth term?
14. A sheet of paper measures 3 feet by 5 feet. What is the maximum number of 4 inch by 6 inch cards that can be placed on this sheet of paper without overlapping or cutting the cards?
15. Some of the problem writers made the following statements:
    - Kelvin the Frog: Alex ate the cake.
    - The Great Sabeenee: Steven is not lying.
    - Alex the Kat: I did not eat the cake.
    - Steven the Alpaca: AJ did not eat the cake.
    - AJ the Dennis: Kelvin ate the cake.

    If exactly one of these people is lying, who ate the cake?
16. 3 integers, not necessarily distinct, are chosen from the numbers 0 to 2013. What is the probability that the product of the numbers is even?
17. A square and an equilateral triangle have equal perimeters. What is the ratio of the area of the triangle to the area of the square?
18. The numbers from 1 to n are arranged evenly around a circle in order. The numbers 17 and 38 are opposite to each other. Compute n.
19. If $x = \sqrt{6 + \sqrt{6 + \sqrt{6 + x}}}$, compute x.
20. The numbers from 1 to 25 will be arranged in a line such that the sum of each two adjacent numbers is a perfect square. What is the smallest number that can be adjacent to 18?

21. When AJ goes for a swim in the ocean, Soonho holds up a certain amount of fingers, and that is how many seconds AJ must stay under the water. If AJ goes under water 10 times and stays under water for a total of 95 seconds, at least how many times did Soonho hold up all ten fingers?

22. If $5^n + 5^n + 5^n + 5^n + 5^n = 5^{2013}$, compute n.

23. Kelvin has 2 coins, one fair, and one with heads on both sides. He randomly selects a coin with equal probability and flips it 4 times. If this coin comes up heads each of the 4 times, what is the probability he chose the unfair coin?

24. A $10 \times 10 \times 10$ cube is painted red and then cut into 1000 $1 \times 1 \times 1$ cubes. How many of these smaller cubes are painted on exactly 2 faces?

25. There are 5 Jims, 6 Janes, and 7 Tinas in one class. If the first letter of a random student's name is J, what is the probability the student's name is Jim?

26. What is the number of factors of the smallest number that ends in a zero and is divisible by 24?

27. In $\triangle ABC$, let X be a point on BC such that $AX = BX = AC$. If $\angle BAX = 20^\circ$, compute $\angle XAC$.

28. A birthday cake in the form of a cylinder can feed 8 people. If the height and radius are both doubled, how many more people can the new cake feed?

29. The numbers from 1 to 9 are arranged in a 3×3 grid. The sum of each column, row, and diagonal is calculated. These eight sums add up to 124. What is the sum of the diagonals?

30. Because of genetic mutations, 1 gosling is born out of every 102 duck eggs. Out of these goslings, 1 out of 3 is thought to be an ugly duckling. How many ugly ducklings are there in a set of 10404 duck eggs?

31. What is the value of $\left(1 + \frac{1}{1}\right)\left(1 + \frac{1}{2}\right)\left(1 + \frac{1}{3}\right)\cdots\left(1 + \frac{1}{2013}\right)$?

32. Kelvin the Frog picks 2 numbers. He discovers that not only are both numbers prime, but they also sum to 2013. What is the larger number?

33. If the numerical value of the surface area of a cube is equal to 6 times its side length, then what is the volume of the cube?

34. A rectangle with side lengths of 6 and 8 is centered at the origin of a coordinate plane. This rectangle slowly spins around the origin, creating a circle. Compute the area of this circle.

35. 3 distinct numbers are chosen from the set $\{1, 1, 2, 3, 5, 8, 13, 21, 34, 55\}$. What is the probability that the 3 numbers form the side lengths of a non-degenerate triangle?

36. How many subsets of the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ have an odd number of elements?

37. An ant is standing on a cube of length 1. If the ant is standing on a vertex, what is the minimal distance it must travel on the cube to get to the opposite vertex of the cube?

38. What are the last 2 digits of 7^{16}?

39. How many ordered triples of solutions (a, b, c) are there in positive integers to the equation $a + b + c = 10$?

40. Let x be a value for which $x^2 - x + 1 = 0$. Compute the number a such that $x^4 + ax^2 + 1 = 0$.

41. Dennis is walking around the Forest of Origins with an empty bucket to get water. If his current coordinates are $(0, 0)$, and the river is located on the line $y = -5$, what is the minimal distance he must travel to get to the river, get water, and walk to his house located at the point $(5, 2)$?

42. Find the value of $3 + \cfrac{3}{3 + \cfrac{3}{3 + \cfrac{3}{\ddots}}}$.

43. In equiangular hexagon $ABCDEF$, $BC = DE = FA = 2AB = 2CD = 2EF$. If the area of the hexagon is $52\sqrt{3}$, what is the perimeter of the hexagon?

44. What is the smallest positive integer with 22 positive divisors?

45. A 6×6 square is partitioned into 36 1×1 squares. In each unit square, the number of squares containing that unit square is written. For example, the number 6 would be written in a corner square, as it is contained in exactly 6 squares. What is the sum of all 36 of these numbers?

46. A set is "good" if it does not contain any 2 consecutive integers. How many subsets of the set $\{1, 2, 3, \ldots, 10\}$ are "good"?

47. 6 students are at an amusement park. They agree to a "buddy system" in which they divide themselves into groups containing at least 2 people. In how many ways is this possible?

48. How many ways can you sort 10 indistinguishable balls into 4 distinguishable boxes?

49. AJ and Mark decide to meet at a Dunkin' Donuts. They agree to meet between 1 and 2, but neither of them can remember exactly what time. They each arrive at a random time between 1 and 2 and wait for 10 minutes before leaving. What is the probability that they will meet?

50. Positive real numbers x, y, z satisfy $x + y + z = 9$ and $16xy + 9xz + 4yz = 9xyz$. Find the maximum possible value of xyz.