1. What is the maximum number of parts that can be obtained from cutting a circular cake using 3 straight cuts?

---

2. Evaluate $2014 \times 2014 - 2013 \times 2015$.

---

3. Solve $\sqrt{x + \sqrt{x + \sqrt{x+\ldots}}} = 3$.

4. Mersenne primes are prime numbers of the form $M_p = 2^p - 1$, where p is a prime. For example, $3 = 2^2 - 1$ is a Mersenne prime. Find the 4th largest Mersenne prime.

---

5. Simplify $(x - a)(x - b)(x - c) \ldots (x - z)$.

---

6. If x and y are positive integers, find the values of x and y which satisfy the equation

$$x^2 - 4y^2 = 41.$$

7. Find the dimensions of all the rectangles with integral sides whose area and perimeter are numerically equal.

---

8. A whole number is between 40 and 70. When it is divided by 3, the remainder is 1. When it is divided by 7, the remainder is 2. Find the number.

---

9. Find the value of $\frac{1}{2014}+\frac{3}{2014}+\frac{5}{2014}+\ldots+\frac{2013}{2014}$.

10. Find the sum of the terms in the nth pair of brackets:

(1, 2, 3, 4), (5, 6, 7, 8), (9, 10, 11, 12), …

End of paper

Solutions	
1.	8
2.	1
3.	6
4.	127
5.	0
6.	X = 21, y = 10
7.	3 by 6, 4 by 4
8.	58
9.	503.5
10.	$4n - 1$