

1. For how many integers  $n$  is  $\sqrt{16 - (n + 2)^2}$  a real number?
2. The number of prime numbers less than 1 million whose digital sum is 2?
3. An eight digit number is a multiple of 73 and 137, if the second digit from left is 7 what is the 6<sup>th</sup> digit from the left of the number?
4. The four digits number  $8ab9$  is a perfect square. The value of  $a^2 + b^2$  is
5. The least positive integer  $n$  such that  $2015^n + 2016^n + 2017^n$  is divisible by 10 is
6.  $A = (2 + 1)(2^2 + 1)(2^4 + 1) \dots (2^{2048} + 1)$ . The value of  $(A + 1)^{\frac{1}{2048}}$  is
7. Find the number of positive integer  $n$ , such that the remainder is 7 when 2007 is divided by  $n$ .
8. What is the units digit of  $3^{1999} \times 7^{2000} \times 17^{2001}$ ?
9. What is the remainder of  $(123456789)^4$  when it is divided by 8?
10. What is the smallest positive integer  $n > 1$  such that  $3^n$  ends with 003?
11. Find the unit digit of the product of all the prime numbers between 1 and  $(17)^{17}$
12. Find the number of ordered pair  $(a, b)$  for which the number 6 2 4 9 a 7 5 0 8 b 2 7 is divisible by 11
13. The five digit number  $2a9b1$  is a perfect square. Find the value of  $a^{b-1} + b^{a-1}$
14.  $a, b, c$  are digits of a 3 digit number such that  $64a + 8b + c = 403$ , then the value of  $a + b + c + 2013$  is
15. Positive integers  $a$  and  $b$  are such that  $a + b = \frac{a}{b} + \frac{b}{a}$ . What is the value of  $a^2 + b^2$ ?

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