

# *Testmoz High School*

## *Contest*

### **Test 1**

December 21-23, 2018

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Grade:** \_\_\_\_\_

**DIRECTIONS**

There are 6 questions, in which you have 30 minutes to complete. Each correct answer is worth 1 point, and each incorrect or skipped answer is worth 0 points. Write your answer for each question in the blank for each respective question. **Any calculator without a QWERTY keyboard is allowed.** Answers must be exact or have 4 (or more) significant digits, correctly rounded. Figures are NOT drawn to scale. Your cumulative score will be the sum of all your contest scores.

<i>Problems</i>	<i>Answer Column</i>
1. A Mersenne prime is a prime that can be expressed in the form, $2^n - 1$ , for $n$ is a positive integer. What is the fifth Mersenne prime?	1.
2. How many positive integer ordered pairs $(x, y)$ satisfy the equation $4x + 5y = 2018$ ?	2.
3. A regular octagon is circumscribed about a circle, which is circumscribed about a square. What is the ratio of the area of the octagon to that of the square's?	3.
4. Jorge observes a certain number of rocks and numbers them in a random order. He then places these rocks in a circle, such that the 7 <sup>th</sup> rock he places is opposite the 23 <sup>rd</sup> rock he places. Assuming Jorge places the rocks in the same order as he numbered them, how many rocks did Jorge observe?	4.
5. What is the greatest integer that can be expressed in the form $2018m + 2019n$ ?	5.
6. Meera is carving a pumpkin. She carves $\frac{2}{3}$ of the pumpkin, then hands it to Joe, who carves $\frac{1}{2}$ of the remaining part. Joe then hands it back to Meera the next day so she can carve the same ratio and continue on with the same pattern. After how many whole days will the pumpkin be more than 99.95% finished with carving?	6.

