2019 Wits Mathematics Competition
Final Round
Grades 6 and 7
Time: 90 Minutes

Instructions

This exam consists of 12 questions. The first 10 are single answer and are worth 3 marks each. The last 2 are proof questions which require full solutions. They are out of 10 marks each.

"A mathematician is a device for turning coffee into theorems." — Paul Erdos

Full Name:
School:
Division: **Upper Primary**
Grade:
E-mail:

Answer Section A below

1	
2	
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A. Single Answer Questions

1. Find the remainder when 2019 is divided by 37.

2. How many prime numbers are there between 1 and 100?

3. Compute $\frac{1\times2\times3\times...\times21}{1\times2\times3\times...\times19}$.

4. A rectangular swimming pool has area $91m^2$ and length $13m$. Find its perimeter.

5. A learner was looking through her math book and discovered that after page 24, the next page was 31. How many page sheets were torn out of her book?

6. A book costs R300. Its price is increased by 20 percent and then decreased by 25 percent. Calculate the final price.

7. Consider the fractions $\frac{1}{81}$,$\frac{2}{81}$, $\frac{3}{81}$,...,$\frac{80}{81}$,$\frac{81}{81}$.If each fraction is written in simplest form how many will have a denominator of exactly 9?

8. Two fair 6 sided dice are rolled. The score of this roll is given by the sum of the 2 numbers rolled. Find the probability of obtaining a prime score.

9. A $20 \times 20 \times 20$ cube is constructed by sticking 8000 unit cubes together. The cube is subsequently dropped in paint and then broken up into the original 8000 cubes. How many cubes have exactly 1 painted side?

10. 2019 can be written as a sum of 3 consecutive odd numbers. Find the smallest of these.

B. Proof Questions

11. Three sisters decide to paint a wall. The eldest sister could have painted it herself in 3 hours, the middle sister would have taken 4 hours and working together the three sisters can paint it in 80 minutes. How long would it take the youngest sister to paint the wall alone?

12. What is the last digit of $2019^{2019} + 2018^{2019} + 2017^{2019} + \ldots + 2^{2019} + 1^{2019}$?