Liberian Math Olympics
4 July 2013
Individual Round Answer Sheet

Name: _____

School: _____

Instructions

Please read the following instructions carefully.

- **Write your name and school in the appropriate area of this sheet.**

- The test will be 60 minutes long and contains 20 problems.

- You will receive one point for each correct answer and zero points for each black or incorrect answer.

- Only the answers written on the this answer sheet will be scored.

- Because there is no penalty for wrong answers, you should answer each question, even if you have to write a complete guess.

- On average, you have three minutes per problem. If you're stuck on one problem, you should move on to the next one and come back later if you have time.

- Once the test starts, you may separate this answer sheet from the rest of the test.

- Good luck!

Answers

1. _____   11. _____

2. _____   12. _____

3. _____   13. _____

4. _____   14. _____

5. _____   15. _____

6. _____   16. _____

7. _____   17. _____

8. _____   18. _____

9. _____   19. _____

10. _____   20. _____

For Grader Use Only

Score	Initials

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1. A store sells the jerseys of Barca, Real Madrid, Manchester United, and Chelsea. Each jersey is sold in three sizes: small, medium, and large. How many different types of jerseys are there?

2. What is $\sqrt{3^2 \times 4^2}$?

3. In 2014, the 4th of July will be a Friday. What day of the week will the 4th of July be in 2015?

4. A prime number is a positive integer that has exactly two different divisors, 1 and itself. What is the smallest prime number?

5. An umbrella costs 225 LD. If the exchange rate is 1 USD for 75 LD, then how many USD does the umbrella cost?

6. What is the probability that a random integer in $\{1, 2, 3, \ldots, 10\}$ is a multiple of 3?

7. I am thinking of a two-digit number. The sum of the digits is 11. One digit is 5 more than the other one. The number is odd. What number am I thinking of?

8. Six people are in a room. If each person shakes hands with each other person exactly once, then how many total handshakes are there?

9. Compute 90% of 50% of $\frac{1}{3}$ of 360.

10. In $\triangle ABC$, $\angle A = 40°$, $\angle B = 70°$, and $\angle C = 70°$. Additionally, $AB = 4$. What is the value of AC?

11. On his first 4 math exams, Mohammed scores 90, 95, 96 and 88. On his fifth exam, he does not study and does poorly. His average on the 5 exams is 84. What did he score on his fifth exam?

12. What is the length of the longest straight line that can be drawn within a square that has sides of length 2?

13. What is the product of all of the integers from -7 to 7, inclusive? That is, compute

$$(-7)(-6)(-5)\cdots 5 \cdot 6 \cdot 7.$$

14. A, B, C, D are points in order on a line. $AC = 8$, $BD = 7$, and $BC = 3$. What is AD?

$$\overline{\quad\quad\overset{\bullet}{A}\quad\quad\overset{\bullet}{B}\quad\quad\overset{\bullet}{C}\quad\quad\overset{\bullet}{D}\quad\quad}$$
(not to scale)

15. A car wheel is 3 feet in diameter. How many rotations will the wheel make as the car drives 1 mile? (There are 5280 feet in one mile.) Write your answer in terms of π.

16. A circle of diameter 1 is drawn within a square of side length 1. To the nearest percent, what percent of the square lies outside the circle? (You may use the fact that $\pi \approx 3.14$.)

17. An equilateral triangle that has three sides of length 1 has area $\frac{\sqrt{3}}{4}$. What is the area of an equilateral triangle with three sides of length 4?

18. A palindrome is a number that is the same read backwards as read forwards. 3993, 6008006, and 12321 are examples of palindromes. 330 is not a palindrome: when read backwards, it is $033 = 33$. How many palindromes are 4 digits long and greater than 1000?

19. A rhombus is a quadrilateral with all sides of equal lengths. Rhombus $ABCD$ has two diagonals. Diagonal AC has length 12 and diagonal BD has length 20. What is the area of the rhombus?

20. If all men work at the same rate and 4 men can build 4 houses in 20 days, how long will it take for 27 men to build 15 houses?