Philippine International Mathematical Olympiad

PhIMO

MOCK PAPER 2020

SECONDARY 1

NAME OF PARTICIPANT: _____ **DATE**: _____

SCHOOL NAME: _____

GENERAL INSTRUCTIONS:

1. Do not open the booklet until you are told to do so.
2. You are given 90 minutes to attempt all 25 questions.
3. Ensure to enter the necessary information asked in the Answer Sheet such as your name, participant number, country, and year level.
4. Record your answers neatly on the Answer Sheet provided.
5. Marks are awarded for correct answers only. There is no penalty for incorrect answers.
6. Calculators are not allowed.
7. All figures are not drawn to scale. They are intended only as aids.
8. Start answering when the proctor gives the signal.

Part 1 (Questions 1 to 10):

There are 10 multiple-choice questions. Choose the best answer from the four possible choices

Each question carries 2 marks

Part 2 (Questions 11 to 25):

There are 20 open-ended questions, each requiring a single answer. Write your answer on the box provided in the Answer Sheet

Questions 11 to 20, each carries 3 marks

Questions 21 to 25, each carries 5 marks

DO NOT REMOVE this exam paper from the exam venue

Part 1: 1st to 10th Multiple Choice

1. $\frac{28x}{45} = \frac{77}{165}$, then what is the value of x?

   A. 0.25 B. 0.50 C. 0.75 D. 0.90 E. 0.60

2. There are 29 people in a room. Of these, 11 speak French, 24 speak English and 3 speak neither French nor English. How many people in the room speak both French and English?

   A. 3 B. 4 C. 6 D. 8 E. 9

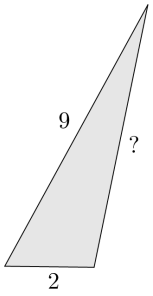
Question 3

3. A brood of 5 hens are working together to produce 55 eggs in 5555 days. What is the average number of days it takes a single hen to lay an egg?

   A. 11 B. 101 C. 505 D. 555 E. 111

4. Evaluate the sum $1^2 + 3^2 + 5^2 + ... + 23^2 + 25^2$.

   A. 2930 B. 2925 C. 2920 D. 2915 E. 2910



Question 5

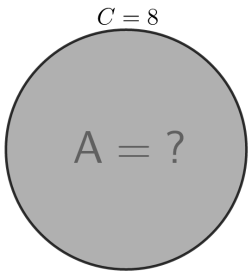
5. The lengths of two sides of a triangle are 2 and 9. Which of the following could be the length of the third side?

   A. 4 B. 6 C. 8 D. 12 E. 14

6. The sum of seven consecutive integers is 980. How many of them are prime?
   A. 1 B. 2 C. 3 D. 4 E. 0

7. The values of $7x + 6y = 4002$ and $6x + 7y = 2004$. Determine the exact value $x + y$.
   A. 221 B. 400 C. 462 D. 487 E. 770

8. Factor completely: $x^2 - y^2 - 4y - 4$
   A. $(x - y + 2)(x + y + 2)$ B. $(x + y - 2)(x + y + 2)$ C. $(x - y - 2)(x - y + 2)$
   D. $(x - y - 2)(x + y - 2)$ E. $(x - y - 2)(x + y + 2)$



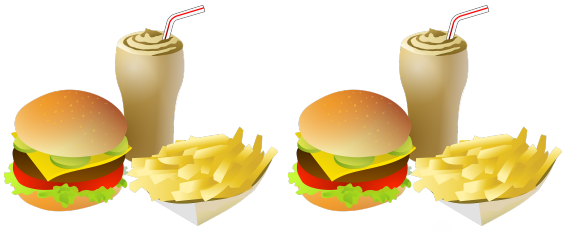
Question 9

9. What is the area of a circle with circumference 8?
   A. $\frac{16}{\pi}$ B. 16π C. $16 + \pi$ D. $16 - \pi$ E. 16

Question 10

10. A dice is thrown four times in a row. Find the probability of getting different result each throw.
    A. $\frac{5}{18}$ B. $\frac{1}{4}$ C. $\frac{7}{12}$ D. $\frac{5}{13}$ E. $\frac{1}{18}$

Part 2: 11^{th} to 30^{th} Open-ended Questions



Question 11

11. The cost of 9 milk shakes, 1 order of fries and 5 hamburgers at a certan fast food restaurant is \$39.50. At the same restaurant, the cost of 3 hamburgers, 5 milk shakes, and 1 order of fries is \$23.50. What is the cost(in dollar) of 2 milk shakes, 2 hamburgers, and 2 order of fries at this restaurant?

12. There are 120 members in a Zoom meeting. 40% of them are boys. The head of the meeting would like to tune the percentage of boys to 30%. How many girls are need to be added?

13. A $4-$digit number has a remainder 4 when divided by 11,9 and 5. What is the maximum value of this number?

14. Carl have a list of real numbers, whose sum is 40. If Carl replaces every number x on the list by $1-x$, the sum of the new numbes will be 20. If instead Carl had replaced every number x by $1+x$, what would be the sum?

15. At a party, every two people shook hands once. How many people attended the party if there were 66 handshakes.

16. If $x+y=0$ and $x,y\neq 0$, then what is the value of $\dfrac{x^{2020}}{y^{2020}}$?

17. What is the least positive integer n such that $1+2+\cdots+n>100$?

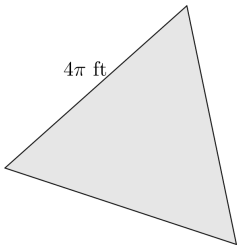
18. What is the units digit of 7^7?

19. The absolute value of x always represents the positive value, that is, $|-2|=2$ and $|3|=3$. Determine the value of $\dfrac{|-7|+|7|+|2|}{|3|+|-4|+|3-4|}$.

20. Find the value of $1^2+2^2+3^2+\cdots+28^2+29^2+30^2$.

21. Real numbers m,n satisfy the equation $m^2+n^2=0$. For how many values of x does the equation $mx+b=2020$ have?

22. When the length of a cuboid increases by 1cm, the volume will be increased by $12cm^3$. When the width inceases by 2cm, the volume will be increased by $15cm^3$. When the height increases by 3cm, the volume will increased by $30cm^3$. Determine the volume of the cuboid in cm^3.



Question 23

23. The side length of an equilateral triangle is 4π ft. Its perimeter has the same value of the circumference of a certain circle. Determine the radius of the circle in ft.

24. A cube with side length 11cm is colored and cut into cubes with length equal to 1cm. Find the number of cubes with 2-side colored.

25. A certain rectangle has length and width that are both integers. If the area of the rectangle is 676, what is the minimum possible value of its perimeter?