American
Mathematics Olympiad

PRIMARY 5 (GRADE 05) MOCK TEST PAPER SET 1

NAME: _____ **Index Number:** _____

SCHOOL: _____

INSTRUCTIONS:

1. Please **DO NOT OPEN** the contest booklet until the Proctor has given permission to start
2. TIME: **1 hour 30 minutes**.
3. There are 25 questions with 100 total points:

Section A: Questions 1 to 15 score 3 points each, no points are deducted for an unanswered or wrong answer.

Section B: Questions 16 to 20 score 5 points each, no points are deducted for an unanswered or wrong answer.

Section C: Questions 21 to 25 score 6 points each, no points are deducted for an unanswered or wrong answer.

4. Shade your answers neatly using a **2B lead pencil** in the Answer Entry Sheet.
5. PROCTORING: No one may help any student in any way during the contest.
6. No electronic devices capable of storing and displaying visual information are allowed during the course of the exam. Strictly **No Calculators** are allowed.
7. All students must fill and shade their **Name, School and Index Number** in the Answer Entry Sheet and Contest booklet.
8. MINIMUM TIME: Students must stay in the exam hall for at least 1 hour.
9. A student must show detailed working and transfer answers to the Answer Entry Sheet.
10. **No exam papers and written notes can be taken out by any contestant.**

SINGAPORE INTERNATIONAL MASTERY CONTESTS CENTER
SIMCC

SIU CARBONDALE
SOUTHERN ILLINOIS UNIVERSITY
STEM EDUCATION RESEARCH CENTER

LIVEWORKSHEETS

ROUGH WORKING

LIVEWORKSHEETS

SECTION A: 15 Multiple Choice Questions
3 points each

Question 1

Brenda multiplies a number by 3, adds 3, divides by 3, adds 6, subtracts 3 from the result to get 9. What is six times of the original number?

A. 5
B. 3
C. 30
D. 54
E. 126

Question 2

2021 is the sum of at least how many positive two-digit numbers?

A. 20
B. 21
C. 202
D. 203
E. 1011

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Question 3

Which of the following is true?

A. If a circle and a regular octagon have the same area, the length of the radius of the circle will be equal to the distance between the centre of any vertex of the octagon.
B. The difference between the number of sides of an octagon and a trapezium is a prime number.
C. All regular quadrilaterals have sides of equal length.
D. Four more than the sides of a decagon is the same value as the total number of sides of two heptagons stuck to each other.
E. The area of only right triangles is given by $(b \times h) \div 2$

Question 4

Natural numbers are also called counting numbers and they are positive integers starting from 1. For example, 1, 2, 3, 4, ... are natural numbers. The average of the sum of the first 4 natural numbers and the first 5 even numbers is:

A. 10
B. 20
C. 30
D. 40
E. 4.5

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Question 5

One-fifth of all apples in a crate is rotten. Three-fourths are ordinary. The remaining are considered excellent. If there were 200 apples in a crate, how many excellent apples did it have?

A. 10
B. 40
C. 160
D. 190

Question 6

Amanda's score was twice Brian's score. Cassie scored 5 points less than Brian. Dora scored 10 points more than Amanda. Dora's score was 6 times as much as Cassie's. Whose score was 10?

A. Amanda
B. Brian
C. Cassie
D. Dora

LIVEWORKSHEETS

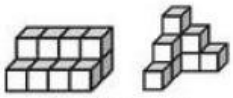
Question 7

The largest natural number formed by the digits 4, 5, 0, 3 and the smallest number formed by using all of those digits exactly once, are subtracted. Assume that a valid number does not start with 0 unless it is 0 itself (which we shall consider to be a 1-digit number.) What is the number formed by the first two digits of the result?

A. 23
B. 85
C. 50
D. 57

Question 8

Observe the two shapes. Find the total volume of the shapes, if all have equal unit sides of 3 cm. Assume it is a packed figure where the invisible areas also are packed with cubes of similar sizes and that the figures fit flush into the corner of the rectangular walls of a room.



A. 12 cm^3
B. 27 cm^3
C. 567 cm^3
D. 81 cm^3
E. 48 cm^3

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Question 9

What is the size of the problem space (i.e. if you count all the possible values, how many such values are there) of the following experiment: "Guessing a 4 digit ATM pin". (Assume that each digit of the pin can have values from 0—9)

A. 10,000
B. 256
C. 40
D. 6561
E. 10

Question 10

Dr. Hazma, Dr. Tan and Dr. Gupta created vaccines in their labs. Dr. Hazma's vaccine showed 98% effectiveness. Dr. Tan's was 92% effective. Dr. Gupta's was 93% effective. What was the probability that all three were simultaneously effective? Assume they are independent trials.

A. Not possible
B. 83.85%
C. 16.15%
D. 12%
E. Not possible to determine

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Question 11

Three pentagons are stuck together as shown below. All sides are equal and measure 3 cm. What is the difference between the total perimeter of the three individual pentagons and the final figure?



A. 12 cm
B. 6 cm
C. 45 cm
D. 33 cm

Question 12

What is the 2021st number in the sequence below?

$$7, 9, 11, 13, \ldots$$

A. 2028
B. 4041
C. 4047
D. 4050
E. 4042

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Question 13

Which of the following numbers has an odd number of even prime factors?

A. 182
B. 442
C. 128
D. 100
E. 400

Question 14

Azma took part in a gymnastics competition where many people participated. When the rank list arrived, it turned out that no one was disqualified. She was the 3rd place ahead of the first of the lower half of the contestants. She was 3rd place behind the bronze medalist. The first prize is a gold medal, the second prize is a silver medal and the third prize is a bronze medal. How many people competed in all?

A. 12
B. 13
C. 15
D. 16
E. 17

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Question 15

A number p is 1.5 times another number q. If p is 18 bigger than q, then what is $p + q$?

A. 18
B. 36
C. 54
D. 108
E. None of the above

Solution

$2p = 3q$
$p = 18 + q$
$2(18 + q) = 3q \Rightarrow 36 = q$ and $54 = p \Rightarrow p + q = 90$

LIVEWORKSHEETS

Section B: 5 Open-Ended Questions
5 points each

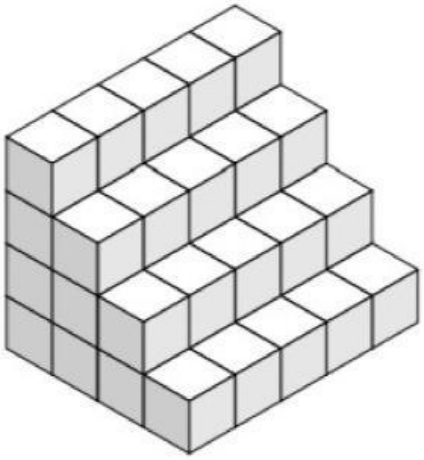
Question 16
A dancer is allowed to step only on one of the following tiles. One is coloured blue, 1 is coloured green, 2 are coloured red, 2 are coloured orange, and 3 are coloured grey. The grey ones are sticky and they cause the dancer to stop dancing. If the chance that the dancer will get stuck on the first step itself is $\frac{m}{n}$, find $m + n$.

Question 17
Five natural numbers are chosen from 1 to 45. These add up to 45. If we call the biggest of these five numbers 'B', what is the largest possible value of B across all such sets of five numbers?

LIVEWORKSHEETS

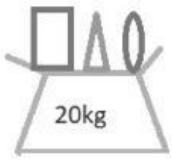
Question 18

Raziya started with the following structure. It is a fully packed box all the way to the back of the top stairs. She added similar unit cubes to build it up to a packed staircase. She has unit cubes that fill a box $3 \times 11 \times 10$ cm^3 in dimensions. (A unit cube is $1 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm}$ in size.). The final staircase she made was 10 steps high. What was the length (width) of each step in her structure?



Question 19

In the weighing scale below, the rectangle weighs 2 kg more than the triangle. The oval weighs 3 kg less than the triangle. What is the weight of the rectangle, in kg?



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Question 20

A five-digit number is formed such that it satisfies the following conditions:

- It is a multiple of 3 and 5.
- The third digit is half of the first digit and one less than the second digit.
- The sum of the first three digits is 13 and the sum of the last three digits is 8.
- The fourth digit is the second-largest digit of that number.

Find the sum of digits of that number.

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Section C: 5 Open-Ended Questions
6 points each

Question 21
Find the perimeter of each small rectangle within (assume they are all the same dimensions), given that the total area of the shape shown is 60 cm^2.

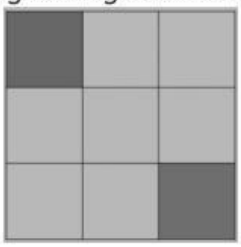


Question 22
A train travelling at 54 km/h passes a platform. A man is standing on the platform, and he sees the train pass him in 20 seconds. Find the length of the train, in meters.

LIVEWORKSHEETS

Question 23

How many ways can we go from the dark square at the top to the dark square at the bottom of the grid moving only right or down and only along the grid lines? No backtracking is allowed. No moving through the same section more than once.



Question 24

A 4-digit number in the form $aabb$ is a perfect square. What is the square root of $aabb$?

LIVEWORKSHEETS