MCME

Examination Paper of the 2nd Mani-Cretin Mathematics Examination

2022 Spring Season

- This is a 40-minute test consisting of 10 fill-in-the-blanks questions. You are not expected to answer all of the questions within the time provided. You MUST fill your answers on the answer sheet on the last page of the exam. Answers not written on the answer sheet might not be assessed.
- Every correct answer is worth 1 point
- 0 point is awarded to every incorrect/blank/incomplete/unrecognizable answer.
- Scratch paper, question paper, and answer sheet may or may not be provided to you.
- You are not allowed to bring any materials other than blank graph paper, pencils, an eraser, a ruler, a pencil sharpener, and a compass. In particular, dictionaries, calculators, protractors, and other digital devices are not allowed.
- Communication of any kind with other participants while doing this exam can be forbidden.
- PARTICIPANTS WHO VIOLATE THE ABOVE REGULATIONS CAN RECEIVE NO CREDIT.

This examination was made possible by the support of the Cretin Organization, Academy of Cretins, Mani Organization, Mani University, Giberia College, and Giberland Philharmonic. This examination was created by the Mani-Cretin Mathematics Association (MCMA). The MCMA's committee on the Mani-Cretin Mathematics Examination (MCME) consists of the following members: Kevin Shi 史笑维 (director), Tata Li 李奥 (founder and president). Go to MCMA's official website to check out our future events, your scores and certificates, solutions, and older problem sets. If you have any questions, email us via the below emails. Questions 1 to 10 are created by Tata Li.

MCMA Official Website: https://mcma-keystone.github.io/MCMA-Keystone/mainpage.html
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Answer Sheet

MCME 2

This is the answer sheet for MCME Elementary Set of 2022 Spring (April) event. Make sure your answers are written on the boxes of the answer sheet. Your answers must be clear and recognizable, otherwise you might not receive full credit.

English Full Name	
Chinese Name	☐ N/A
Email	@student.keystoneacademy.cn

Question	Final Answer
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

1. Compute 1+2+3+ … +98+99+100–98–96– … –6–4–2.

2. Tom walked 3km/hour from his house to a shop 300m away. Afterwards, Tom rode a bus to school that is 2700m from the shop. If Tom took 14 minutes in total, what was Tom's average speed in meter/minute?

3. A normal analog clock has 3 hands. The longest, medium, and shortest hands are second, minute, and hour hands respectively. If the time is 7:00, how many minutes exactly later will the medium and longest hands overlap?

4. Kevin has two similar cones. The first cone has a volume of 12 cm3. The second cone has a volume of 24 cm3. If the base of the first cone is $4/\pi$, then what is the radius of the base of the second cone?

5. James throws a ball. A parabola is a symmetrical curve line. The parabola of the ball can be represented with this function, $y=-4[x^2(1/2)-2x]$. What is the highest point (vertex) of the parabola?

6. A triangle is a closed 2D shape with 3 sides. If the area of the triangle is $\sqrt{720}$ cm^2 and the three sides are consecutive natural numbers, what is the length of the longest side?

Flip page to see question 7 to 10

7. Given the equation $\sqrt{x} + x^y = y!$ and that x and y are all whole numbers, evaluate one possible value of $x + y$?

8. Kevin is a farmer. He farms monkeys, cows, and Mani-monsters (each monster has 1 leg, 1 eye, and 3 hands). Given the total number of animals, 30, the total number of legs of all animals, 61, the total number of hands of all animals, 59, and the total number of eyes of all animals, 51, what is the number of monkeys, cows, and Mani-monsters?

9. A *cretinous* square is a square in which the lengths of the sides and the diagonals are both integers. Draw a *cretinous* square.

10. The City of Cretin is an ancient and cursed place, and 2020 A.D. is its 100,000th anniversary. Cretin citizens don't die. Normally, the population should grow at a steady rate as time elapses; however, the population of Cretin City is much of the same compared to its 10,000th anniversary. To conclude a model demonstrating Cretin City's population, there seems to be a limit. Find the limit of the population of the city referencing the model below. (S_n is the population of Cretin City's n^{th} year. Round the answer to the nearest integer.)

$$S_n = \sum_{x=1}^{n} \frac{100x}{x^x}$$