UNIVERSITY OF NEW BRUNSWICK UNIVERSITÉ DE MONCTON 39th NEW BRUNSWICK MATHEMATICS COMPETITION

Friday, May 10th, 2024

GRADE 9

INSTRUCTIONS TO THE STUDENT:

- 1. Do not start the examination until you are told to do so.
- 2. You are permitted to use rough paper. No other aids are necessary.
- 3. This is a multiple-choice test. Each question is followed by five answers marked A, B, C, D, E. Only one is correct. When you have decided on your choice, mark the appropriate letter on your answer sheet using the pencil provided.
- 4. Problems are worth 3 points each in part A, 4 points each in part B, and 5 points each in part C. The penalty for incorrect answers is one quarter of the points assigned for that question. No penalty is assessed for answers which are left blank.
- 5. Diagrams are NOT drawn to scale. They are intended as aids only.
- 6. You have 60 minutes to answer the questions.
- 7. The use of calculators in the examination room is not allowed.

Part	Α

1. Evaluate $\frac{\frac{1}{3}}{\frac{1}{3}}$ (A) $\frac{7}{12}$ 2. If we multipl last digit of t	$\frac{-\frac{1}{4}}{-\frac{1}{4}}$ (B) $\frac{12}{7}$ (B) the numbers 22 this product?	(C) 7 21, 222, 223, 224,	(D) 12 , up to 229, wh	(E) 14 at will be the		
(A) 0	(B) 2	(C) 4	(D) 6	(E) 8		
 How heavy one ball? (A) 5 g 	is (B) 7 g	(C) 9 g	(D) 10 g	(E) 11 g		
4. The sum of my age and my sister's age is 11. The product of our ages is 24. What is the difference in our ages?						
(A) 1	(B) 3	(C) 5	(D) 7	(E) 9		
5. Lina buys 3 dessert and a	millefeuille desser tart dessert cost	ts and 4 tart dess \$14.70, what is th	serts for \$50.30. If ne price of a single	a millefeuille tart dessert?		
(A) \$5.30	(B) \$6.20	(C) \$7.10	(D) \$8.20	(E) \$8.50		

6. In a Lucas sequence, the first two terms are 2 and 1. Each of the following terms is the sum of the two terms preceding it. Then, the eighth term is equal to

(A) 11 (B) 18 (C) 29 (D) 47 (E) 76

7. Lucas counted 10 triangles in the adjacent figure. How many did he miss?						
	(A) 6	(B) 8	(C) 10	(D) 12	(E) 14	
8.	How many integ	gers n are such that	at $\frac{5}{61} < \frac{1}{n} < \frac{13}{57}$?			
	(A) 1	(B) 6	(C) 7	(D) 8	(E) 9	
9. The area of a rectangular piece of land is 80 square meters. If the width measures 2 meters less than the length, how wide is this land?						
	(A) 8	(B) 16	(C) 24	(D) 30	(E) 40	
10. The average of 3 numbers is 9. When a fourth number is added, the average becomes 8. What is this fourth number?						
	(A) 5	(B) 10	(C) 15	(D) 20	(E) 25	

Part B

11. Three semicircles have a radius 2 cm and ABCD is a rectangle. What is, in cm², the area of the gray section?



- (A) 4 (B) $8 + 2\pi$ (C) $8 2\pi$ (D) 2π (E) 2
- 12. We have two car rental agencies. The first agency charges \$60 per day, plus \$0.25 per kilometer and the second charges \$45 per day, plus \$0.45 for each kilometer. If a car is rented the same day in each of these agencies, at how many kilometers will the overall rental price be the same for both agencies?

(A) 50 km	(B) 75 km	(C) 100 km	(D) 125 km	(E) 150 km
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13. Each gray square hides the same number. Each white square hides the same number. The sum of the three numbers in each line is written to the right of the line. What is the number hidden in the black square?



- (A) 6 (B) 8 (C) 10 (D) 12 (E) 14
- 14. A man's will leaves \$560,000 to his family. According to his will, his money is to be divided as follows : His three children have equal shares, while his wife and sister each have half the share of one child. What is his wife's share?

(A) 50,000 (B) 60,000 (C) 70,000 (D) 80,000 (E) 90,000

15. In a school, the number of students in grade five is 5 times the number of students in grade six. Knowing that the number of students in the grade 6 is 45, what is the total number of student in these two grades of this school?

(A) 180 (B) 230 ((C) 270	(D) 310	(E) 370
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(A) $\frac{25\pi}{2} - 24$ (B) $25\pi - 48$ (C) $50\pi - 24$ (D) $50\pi - 48$ (E) $100\pi - 48$

- 17. Adam was a child for a fifth of his life, an adolescent for a tenth of his life, a civil servant for half of his life and retired for 12 years. At what age did he die?
 - (A) 42 (B) 56 (C) 60 (D) 100 (E) 120
- 18. Let the number made up of 2024 digits and which is obtained by juxtaposing the digits of the number 2024 : 202420242024......2024.What is the maximum number of digits that must be removed from this number to have a new number whose sum of its digits is 2024?
 - (A) 506 (B) 1012 (C) 1518 (D) 2024 (E) 4048
- 19. There are three closed doors and behind one of them is a tiger. A sentence is written on each door.
 - Door 1 : The tiger is behind this door.
 - Door 2 : The tiger is not behind this door.
 - Door 3 : The sum of the three internal angles of a triangle is 360° .

Only one of the sentences written is true. Behind which door is the tiger?

(A) 1 (B) 2 (C) 3 (D) none of these answers (E) no solution possible

20. How many different ways can you read the word KAYAK if you have to read from left to right, or top to bottom, or by combining these two ways?

		K		
	K	Α	Y	
К	Α	Y	Α	K
	Y	Α	К	
		к		

(A) 16 (B) 18 (C) 20 (D) 22 (E) 24

Part C

21.	The sum of the eight digits of the date $05/10/2024$ is equal to 14 $(14=0+5+1+0+2+0+2+4)$. How many dates in 2024 have the sum of their eight digits equal to 27?						
	(A) 0	(B) 3	(C) 5	(D) 10	(E) 15		
22.	22. How many different 4-digit numbers can be formed using only the digits of the number 2024? (The number 2 must be used exactly twice)						
	(A) 5	(B) 6	(C) 7	(D) 8	(E) 9		
23.	3. Assume that A, B and C represent three distinct digits. If 24×AA=BAC, what number represents BAC?						
	(A) 264	(B) 528	(C) 732	(D) 792	(E) 932		
24.	We multiply the numbers 1 to $25: 1 \times 2 \times 3 \times 4 \times \dots \times 23 \times 24 \times 25$. With How many zeros does this product end?						
	(A) 4	(B) 5	(C) 6	(D) 7	(E) 8		

- 25. There are three candidates for a delegate position. 130 students vote for one of them, and the one of the three with the greatest number of votes wins. The counting is underway. Sonya has 24 votes, Kylian has 29 and Romane has 37. How many votes are Romane missing, at least, to be sure of being elected?
 - (A) 13 (B) 14 (C) 15 (D) 16 (E) 17
- 26. Here is a map of New Brunswick. Paul wants to color this map so that two regions touching each other have different colors. What is the smallest number of colors Paul must use?



