# UNIVERSITY OF NEW BRUNSWICK UNIVERSITÉ DE MONCTON

## 39<sup>th</sup> NEW BRUNSWICK MATHEMATICS COMPETITION

Friday, May 10th, 2024

#### **GRADE 8**

#### 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 A

1.	Find the value of	Find the value of $\sqrt{n}$ if $n = \sqrt{256} + \sqrt{81}$								
	(A) 5	(B) 15	(C) 25	(D) 35	(E) 45					
2.	18 % of 50 % of	8 % of 50 % of 100 is								
	(A) 9	(B) 15	(C) 25	(D) 35	(E) 45					
3.	. Mathieu buys some pens \$2 each and others \$3 each, for a total of \$40. Which of these numbers must be the number of pens at \$3 each Mathieu bought?									
	(A) 7	(B) 12	(C) 13	(D) 15	(E) 16					
4.	4. If we multiply the numbers 221, 222, 223, 224,, up to 229, what will be the last digit of this product?									
	(A) 0	(B) 2	(C) 4	(D) 6	(E) 8					
5.	Lina buys 3 millefeuille desserts and 4 tart desserts for \$50.30. If a millefeuille dessert and a tart dessert cost \$14.70, what is the price of a single tart dessert?									
	(A) \$5.30	(B) \$6.20	(C) \$7.10 (E)	D) \$8.20 (E)	\$8.50					
6.	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.	. How many integers $n$ are there such that $\frac{5}{61} < \frac{1}{n} < \frac{13}{57}$ ?									
	(A) 1	(B) 6	(C) 7	(D) 8	(E) 9					
8.	The area of a rectangular piece of land is 80 square meters. If the width measures 2 meters less than the length, what is the width, in meters, of this land?									
	(A) 8	(B) 16	(C) 24	(D) 30	(E) 40					

	(A) 5	(B) 10	(C) 15	(D) 20	(E) 25
10.	gave half of	the rest to his si	ster Audrey and f	mount to buy a b	f of what was

9. The average of 3 numbers is 9. When a fourth number is added, the average

left to buy a game for his cat. Knowing that he has \$5 left, how much money did Justin have at the beginning?

(A) \$20

(B) \$40

becomes 8. What is this fourth number?

(C) \$60

(D) \$80

(E) \$100

## Part B

11.	Two men enter a restaurant and each hangs his hat on one of the four available hooks. In how many different ways can they hang their hats?						
	(A) 4	(B) 8	(C) 12	(D) 16	(E) 24		
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 per kilometer. If a car is rented for a day in each of those 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		
13.	A group of 16 tourists wants to spend the night in a hotel. The hotel offers rooms with 3 single beds for \$150 a night and rooms with 5 single beds for \$200 a night. If each person occupies a single bed, what is the least this group of tourists have to pay to spend the night in this hotel?						
	(A) \$600	(B) \$700	(C) \$900	(D) \$1,100	(E) \$1,300		
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 student in grade five is 5 times the number of students in grade six . Knowing that the number of pupils in the grade six is 45 students, what is the number of students in these two levels in this school?						
	(A) 180	(B) 230	(C) 270	(D) 310	(E) 370		
16.	A car leaves Moncton towards Halifax at a speed of $120 \text{ km/h}$ . Taking the same path in the opposite direction, another car leaves at the same time from Halifax towards Moncton at a speed of $100 \text{ km/h}$ . Knowing that the distance on this path between the two cities is $253 \text{ km}$ , after how long will the two cars pass each other?						

(A) 49 minutes (B) 69 minutes (C) 75 minutes (D) 80 minutes (E) 89 minutes

17.	Bilal ate 150 cookies in 6 days. Every day, he eats 8 more cookies than the previous day. How many cookies did he eat on the first day?									
	(A) 5	(B) 8	(C) 12		(	D) 1	6		(E) 20	
18.	Let the number made up of 2024 digits and which is obtained by juxtaposing the digits of the number 2024: 2024202420242024.  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	1518 (I		D) 2024			(E) 4048	
19.	9. Three children share 44 cm of yarn. Bob takes 4 cm more yarn than Carla. Ali takes double Carla's length. What is the length of yarn did Bob take?									
	(A) 10 cm	10 cm (B) 11 cm (C) 12 cm (D) 13 cm (E				(E) 14 cm				
						K				
20.	How many different ways can you		•		K	Α	Y			
	read the word KAYAK if you have to read from left to right, or top to bottom, or by combining these two ways?			K	Α	Υ	Α	K		
					Υ	A	K			
						K				

(C) 20

(D) 22

(E) 24

(A) 16

(B) 18

### Part C

21. The units digit of  $3^{2024}$  is



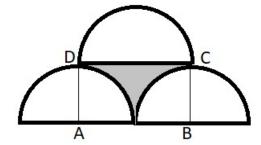
(B) 1

(C) 3

(D) 7

(E) 9

22. Three semicircles have a radius 2 cm and ABCD is a rectangle. What is the area, in cm<sup>2</sup>, of the gray section?



(A) 4

(B)  $8 + 2\pi$ 

(C)  $8 - 2\pi$ 

(D)  $2\pi$ 

(E) 2

23. 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

24. How many ways can we write the number 10 as the sum of three positive integers, which can be repeated, if the order in which the sum is written is not important? For example, 10 = 1 + 4 + 5 is one of these sums and is the same sum as 10 = 4 + 1 + 5.

(A) 5

(B) 6

(C)7

(D) 8

(E) 10

25. 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

26. Melodie and Olfa have chickens and sheep in an enclosure. Melodie counts all the heads and finds 18. Olfa counts all the legs and finds 44. How many sheep are there in this enclosure?

(A) 2

(B) 4

(C) 6

(D) 8

(E) 18