UNIVERSITY OF NEW BRUNSWICK UNIVERSITÉ DE MONCTON

37th NEW BRUNSWICK MATHEMATICS COMPETITION

Friday, May 10th, 2019

GRADE 7

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.	Which number is the largest?								
	(A) $4 \times 4 \times 4$	(B) 7×10	(C) $85 - 17$	(D) 23×3	(E) $45 + 26$				
2.	What is the value	e of $[(+9) + (-4)] -$	+(+7) + (+25) - [(+	8) - (-5)]?					
	(A) 10	(B) 13	(C) 18	(D) 22	(E) 24				
3.	What is the value	e of : $\frac{2}{3} + \frac{1}{4}$?							
	(A) $\frac{5}{6}$	(B) $\frac{11}{12}$	(C) 1	(D) $\frac{13}{12}$	(E) $\frac{7}{6}$				
4.	My parents won — one third will — one quarter w — two sixths wi What will remain (A) \$50	\$1,200 in the lottery l go to the bank to p vill be spent buying ll be used to repair n of the amount wor	y. They decide to sha pay the mortgage. toys. the family car. n?	(D) \$200	ollows				
	(A) \$50	(B) \$100	(C) \$150	(D) \$200	(E) \$250				
5.	The base of an aquarium measures 80 cm by 60 cm. If you pour $48,000 \text{ cm}^3$ of water into the aquarium, what will be the depth of the water?								
	(A) 4 cm	(B) 5 cm	(C) 6 cm	(D) 10 cm	(E) 14 cm				
6.	A salesman receir \$1,000. If last we	ves a 10% commission wek's sales totalled \$	on on the first \$1,000 5,000 then what was	of sales, and 15% fc s the salesman's tota	or all sales above al commission?				
	(A) \$500	(B) \$600	(C) \$700	(D) \$800	(E) \$900				
7.	Jules and Ginette bag. If six marbl as many as Gine	e each have a bag of es were removed fro tte's. How many ma	marbles. Jules's bag m each bag, Jules's rbles does Jules's ba	contains twice as m bag would then con g contain at the sta	any as Ginette's tain three times art?				

(A) 12 (B) 18 (C) 24 (D) 30 (E) 36

- 8. A lumberjack usually starts his days slowly. Today he cut 8 trees in his first hour of work. Every hour thereafter, he cut one more tree than during the previous hour. How many trees did this lumberjack cut today if he worked eight hours in all?
 - (A) 77 (B) 88 (C) 90 (D) 92 (E) 108
- 9. Three numbers are said to be related if the product of the first two is equal to the sum of the last two. For example the three numbers of the triple (3, 4, 8) are related because $3 \times 4 = 4 + 8$. Which of the following triples does not contain three related numbers?

(A) (2, 3, 3) (B) (2, 5, 5) (C) (3, 3, 6) (D) (4, 5, 15) (E) (4, 6, 20)

10. Apples cost \$1 each and oranges \$1.25 each. You buy two apples and three oranges and you pay with a \$10 bill. How much change does the seller give back to you?

	(A) \$3.25	(B) \$4	(C) \$4.25	(D) $$5.25$	(E) \$6.25
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<u>Part B</u>

- 11. Lina and Lana call each other. Their phones emit a beep as soon as the connection is established. Lina's phone issues this signal every 15 minutes and Lana's does every 12 minutes. After how many minutes of conversation will their phones beep together?
 - (A) 20 (B) 40 (C) 60 (D) 80 (E) 100
- 12. A worker at a retail store worked 49 hours last week. 35 hours were regular hours, 6 were paid time and a half and the rest at double time. Find the worker's gross earnings during the past week if his regular hourly rate of pay was \$12.
 - (A) \$520 (B) \$620 (C) \$720 (D) \$820 (E) \$920
- 13. Two planes depart at 9 am from cities A and B located 4,500 km apart. The first plane goes from A to B. Its speed is 1,100 km/h. The second plane goes from B to A. Its speed is 900 km/h. At what time do they meet?

(A) 11 am (B) 11:15	m (C) 11:30 am	(D) $11:45 \text{ am}$	(E) noon
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- 14. The exams were too difficult at the Pickers School this year. Only one student passed both the math test and the science test. If 57 students failed the math test and 44 failed the science test and there are 100 students at this school, how many students failed both the math test and the science test?
 - (A) 0 (B) 1 (C) 2 (D) 3 (E) 5
- 15. In the decimal system we use the powers of 10 increasing from the right to the left and the possible digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. Thus, the number 123 is equal to $(3 \times 1) + (2 \times 10) + (1 \times 100) = 123$. In the binary system we use the powers of 2 instead of using the powers of 10 and the possible digits are 0 and 1. For example, 11001 is a binary number. Calculating from the right, using the increasing powers of 2, this number is equal to $(1 \times 1) + (0 \times 2) + (0 \times 4) + (1 \times 8) + (1 \times 16) = 25$. What is the binary number 10101 equal to?
 - (A) 11 (B) 21 (C) 31 (D) 41 (E) 51
- 16. Lina wants to arrange a certain number of tokens in a square (for example with 9 tokens she can make a square of 3 by 3). In trying to form a first square, she realizes that there are 14 tokens left. She then tries to make a second square by putting one more token per side. She then has 11 too few tokens. How many tokens did Lina have at the start?

(A) 128	(B) 138	(C) 148	(D) 158	(E) 168
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17. Pinocchio's nose is 5 cm long. When Pinocchio tells a lie, his nose get longer by by 3 cm; but when he tells the truth, his nose is shortened by 2 cm. At the end of the day, Pinocchio told 7 lies and his nose is 20 cm long. How many times did Pinocchio tell the truth during this day?

	(A) 2	(B) 3	(C) 4	(D) 5	(E) 6
18.	You roll two six-sided (A) 4	l dice. How many diffe (B) 5	erent ways can you get (C) 6	(D) 7	(E) 8

19. What is the perimeter, in centimeters, of the quadrilateral shown below?



20. Ed writes all the numbers from 1 to 100 one after the other (12345 ... 9899100). How many times did he write the digit 5?

(A) 10	(B) 18	(C) 19	(D) 20	(E) 25
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$\underline{Part \ C}$

21. How many rectangles (including squares) are in the following figure ?



22. The coordinates of the points in the figure below are A : (0, 0), B : (4, 0), C : (-1, 2), D : (-4, 0). The radius of the semi-circle is 4. What is the area of white region inside the semi-circle?



(A) $8\pi - 16$ (B) $8\pi - 12$ (C) $8\pi - 8$ (D) $16\pi - 16$ (E) $16\pi - 12$

23. How many numbers from 1 to 61 are multiples of two or three but not both?

(A) 20	(B) 25	(C) 30	(D) 40	(E) 50
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24. In a magic square, when you add up all the numbers in a row, a column, or a diagonal, you always get the same result. The square below is magic and contains all the natural numbers from 1 to 16. We have already placed some of them.

What should the number in the shaded box be?

		7	12	1	14			
			13		11			
			3					
		9						
(A) 2	(B) 8		(C) 10)	(1	D) 15	(E) 16

25. Two dimes with a nickel or five nickels give you two distinct ways of having a sum of 25 cents. In how many distinct ways can you have a sum of 50 cents using nickels, dimes and quarters?

(A) 5 (B) 7 (C) 9 (D) 10 (E)) 11
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26. The fuel consumption rate represents the number of liters of gasoline needed to travel 100 km. If a gallon equals 4.5 liters and a mile equals 1.6 kilometers, what is the rate of fuel consumption (in liters per 100 km, to the nearest integer) of a car doing 20 miles per gallon?