

**UNIVERSITY OF NEW BRUNSWICK**

**UNIVERSITÉ DE MONCTON**

**37<sup>th</sup> NEW BRUNSWICK  
MATHEMATICS COMPETITION**

Friday, May 10<sup>th</sup>, 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)  $7 \times 10$       (C)  $85 - 17$       (D)  $23 \times 3$       (E)  $45 + 26$
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2. What is the value of  $[(+9) + (-4)] - (+7) + (+25) - [(+8) - (-5)]$  ?  
(A) 10      (B) 13      (C) 18      (D) 22      (E) 24
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3. What is the value of :  $\frac{2}{3} + \frac{1}{4}$  ?  
(A)  $\frac{5}{6}$       (B)  $\frac{11}{12}$       (C) 1      (D)  $\frac{13}{12}$       (E)  $\frac{7}{6}$
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4. My parents won \$1,200 in the lottery. They decide to share this amount as follows  
— one third will go to the bank to pay the mortgage.  
— one quarter will be spent buying toys.  
— two sixths will be used to repair the family car.  
What will remain of the amount won ?  
(A) \$50      (B) \$100      (C) \$150      (D) \$200      (E) \$250
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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
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6. A salesman receives a 10% commission on the first \$1,000 of sales, and 15% for all sales above \$1,000. If last week's sales totalled \$ 5,000 then what was the salesman's total commission ?  
(A) \$500      (B) \$600      (C) \$700      (D) \$800      (E) \$900
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7. Jules and Ginette each have a bag of marbles. Jules's bag contains twice as many as Ginette's bag. If six marbles were removed from each bag, Jules's bag would then contain three times as many as Ginette's. How many marbles does Jules's bag contain at the start ?  
(A) 12      (B) 18      (C) 24      (D) 30      (E) 36
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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

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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)

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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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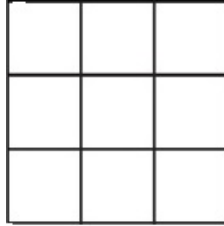
**Part B**

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
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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 am                      (C) 11:30 am                      (D) 11:45 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
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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
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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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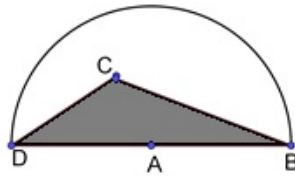
**Part C**

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



- (A) 16                      (B) 26                      (C) 36                      (D) 46                      (E) 56

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

