# UNIVERSITY OF NEW BRUNSWICK UNIVERSITÉ DE MONCTON

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

Friday, May 12th, 2017

## **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. , , interior 01 0	hese numbers is a	multiple of 7?		
(A) 31	(B) 32	(C) 33	(D) 34	(E) 35
2. What is th	the value of $5 \times (3 +$	$(-3) - 8 \times \frac{1}{2}?$		
(A) 5	(B) 11	(C) 14	(D) 26	(E) 44
3. When you	divide 3332 by 9,	what is the remai	nder?	
(A) 0	(B) 2	(C) 4	(D) 6	(E) 8
	is the sum of the		rs are 1 and 1, and bers. Then, the se	
(A) 5	(B) 8	(C) 10	(D) 13	(E) 21
• •	* *		f brothers as I hav sisters." How man	
in this fam	ily?			
	ily? (B) 4	(C) 5	(D) 6	(E) 7
<ul><li>in this fam</li><li>(A) 3</li><li>6. Suppose the following the f</li></ul>	(B) 4 nat you start with hese instructions : a	the number 1000 add 40, add 1000,	(D) 6 and you add on to add 30 and then ag nat is the final resu	that amount gain add 1000,
<ul><li>in this fam</li><li>(A) 3</li><li>6. Suppose the following the f</li></ul>	(B) 4 nat you start with hese instructions : a	the number 1000 add 40, add 1000, inally add 10. Wł	and you add on to add 30 and then ag nat is the final resu	that amount gain add 1000,
<ul> <li>in this fam</li> <li>(A) 3</li> <li>6. Suppose the following the add 20, add (A) 4100</li> <li>7. You throw die shows " are 3 ways</li> </ul>	<ul> <li>(B) 4</li> <li>(B) 4</li> <li>(B) 4900</li> <li>(B) 4900</li> <li>(B) 4900</li> <li>(B) 4900</li> </ul>	the number 1000 add 40, add 1000, inally add 10. Wl (C) 4990 ( . If the result wrig shows "b", and the of 4, namely, (1,	and you add on to add 30 and then ag nat is the final resu	o that amount gain add 1000, dt? none of these that the first c", then there

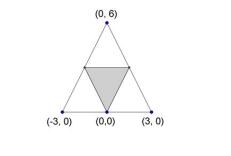
- 8. In the Mathtown zoo, a lion eats three times as much meat as a wolf. A wolf eats twice as much as a lynx and a lynx eats four times as much as a fox. If the lynx has eaten 1 kilogram of meat, how many kilograms of meat have the lion and four foxes eaten in total?
  - (A) 5 (B) 6 (C) 6.5 (D) 7 (E) 7.5
- 9. A bag contains some blue marbles, some red marbles and some green marbles. Exactly  $\frac{2}{3}$  of the marbles are not blue and exactly  $\frac{3}{4}$  of the marbles are not red. What fraction of the marbles are not green?
  - (A)  $\frac{1}{3}$  (B)  $\frac{5}{12}$  (C)  $\frac{1}{2}$  (D)  $\frac{7}{12}$  (E)  $\frac{2}{3}$
- 10. On May 1<sup>st</sup>, a store announces a super smartphone at \$1000. On May 4<sup>th</sup>, the price is reduced by 10%. On May 9<sup>th</sup>, the price is further reduced by 10%. Finally, on May 12<sup>th</sup>, the price is reduced by another 10%. What is the price of this super smartphone on May 12<sup>th</sup>?
  - (A) \$700 (B) \$729 (C) \$800 (D) \$810 (E) \$900

### Part B

- 11. A radio signal sent from the Earth takes 1.25 seconds to reach the Moon which is at a 375,000 km distance from Earth. When the planet Mars is at its closest to the Earth, a radio signal from Mars reaches the Earth after 4 minutes and 10 seconds. What is the distance, in millions of kilometers, between Mars and the Earth when Mars is at its closest to the Earth?
  - (A) 50 (B) 60 (C) 75 (D) 80 (E) 90
- 12. In a house there are two clocks. One clock chimes every 25 minutes. The other clock chimes every 30 minutes. If at a given time both clocks chime together for the first time, how many minutes later will the two clocks chime together for the sixth time?

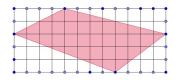
(A) 150	(B) 300	(C) 600	(D) 750	(E) 900
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13. The vertices of the small shaded triangle are the centers of the sides of the large triangle. Coordinates of some points are shown, including all vertices of the larger triangle. If the unit of measure is the cm, what is the area, in square cm, of the small shaded triangle?



- (A) 4 (B) 4.5 (C) 6 (D) 9 (E) 18
- 14. A florist just received 72 red roses and 40 white roses. He wants to make large bouquets of roses, using all of the roses and combining red and white roses. He wants all bouquets to be identical. What is the largest number of bouquets that the florist can make?
  - (A) 8 (B) 12 (C) 16 (D) 22 (E) 25
- 15. Cube A has edges of length 4 cm and Cube B has edges of length 6 cm. What would be the result if the volume of Cube A is divided by the volume of Cube B?
  - (A)  $\frac{2}{9}$  (B)  $\frac{8}{27}$  (C)  $\frac{4}{9}$  (D)  $\frac{16}{25}$  (E)  $\frac{2}{3}$
- 16. In base 10, the value of 123 is  $(1 \times 10 \times 10) + (2 \times 10) + (3 \times 1)$ . If the number 123 was in base 7 it would be equal in base 10 to  $(1 \times 7 \times 7) + (2 \times 7) + (3 \times 1) = 66$ . If a number in base 7 is written 235, what is the value of this number in base 10?
  - (A) 107 (B) 118 (C) 124 (D) 140 (E) 454
- 17. You visited a Chinese garden. You had to cross five doors. At each door you had to leave half of the money you had plus \$1. If you are left with \$1 at the end, how many dollars did you have at the beginning?
  - (A) 22 (B) 31 (C) 46 (D) 63 (E) 94

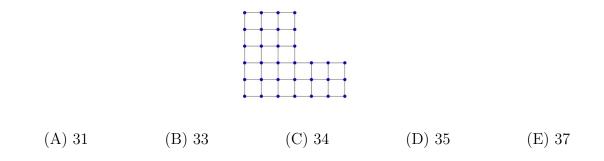
- 18. During the last big storm, 30 cm of snow fell on Mathtown, a city that has a rectangular shape, 3 km wide and 30 km long. If all the snow that has fallen on Mathtown during this storm would fill a very large cube of snow, what would be the length of its side in meters?
  - (A) 30 (B) 100 (C) 300 (D) 1000 (E) 3000
- 19. In the following diagram, each small square has a side length of 1 cm. What is the area, in square cm, of the shaded quadrilateral?



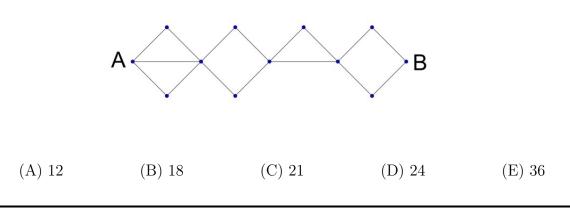
- (A) 24 (B) 28 (C) 30 (D) 32 (E) 36
- 20. Some friends contribute equally to buy a game. If each friend contributes \$3, they have \$2 more than needed. If each friend contributes \$2, they have \$2 less than needed. How many friends are there?
  - (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

### Part C

- 21. If the value of  $3 \times 3 \times 3 \times 3 \times 3 \dots \times 3$  (where the number 3 appears 2017 times in the product) was written out in full, what would be the final digit?
  - (A) 1 (B) 3 (C) 5 (D) 7 (E) 9
- 22. How many squares are there in the following diagram?



- 23. You have a white rook and a black rook, a white knight and a black knight, a white bishop and a black bishop. A matching pair is a set of two pieces of the same color. A matching quadruple is a set of four pieces that is made with two matching pairs. How many distinct matching quadruples can you make?
  - (A) 6 (B) 9 (C) 12 (D) 15 (E) 18
- 24. If you must always move to the right in the diagram below, horizontally or diagonally, how many different paths can you take from A to B?



25. What is the 100<sup>th</sup> positive whole number that does not have a 9 anywhere in its digits?

(A) 115	(B) 120	(C) 121	(D) 125	(E) 130
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26. In a restaurant, 63 customers are eating spaghetti, pizza or chicken wings. 28 of these customers are eating spaghetti, 22 are eating pizza and 34 are eating chicken wings and, among them, 9 are eating both spaghetti and pizza, 7 are eating both spaghetti and chicken wings and 8 are eating both pizza and chicken wings. How many are eating all three of spaghetti, pizza, and chicken wings?

(A) 0	(B) 1	(C) 2	(D) 3	(E) 5
(11) 0		(~) -		(1) 0