

UNIVERSITY OF NEW BRUNSWICK  
and  
UNIVERSITÉ DE MONCTON

JUNIOR HIGH SCHOOL MATHEMATICS COMPETITION

May 14, 1993

GRADE 8

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PART A

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1. Which of the following expressions is not equal to the others?

(A)  $\frac{5}{12}$     (B)  $\frac{1}{2} - \frac{1}{3} + \frac{1}{4}$     (C)  $\sqrt{\frac{25}{144}}$     (D)  $\frac{6^2 - 5^2}{9^2 - 8^2}$

(E) 
$$\frac{1}{\left(\frac{3}{1 + \frac{1}{4}}\right)}$$

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2. How many integers between 1 and 101 are multiples of either 3 or 5 but not multiples of both?

(A) 20    (B) 33    (C) 45    (D) 47    (E) 53

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3. The area of a triangle with a height of 12 cm is  $24 \text{ cm}^2$ . How long is the base of the triangle?

(A) 2 cm    (B) 4 cm    (C) 6 cm    (D) 12 cm    (E) None of these

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4. A school bus transports a group of students. At the first stop, four students get off of the bus and seven others get on. At the second stop, Isabelle and her little sister get off. The remaining twelve students get off at the third and final stop. How many students were on the bus before the first stop?

(A) 10    (B) 11    (C) 12    (D) 13    (E) 14

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5. A newspaper vendor receives a salary of \$10 per week plus 5 cents for each newspaper sold. How many papers must the vendor sell to make \$25 in a week?

(A) 100    (B) 200    (C) 210    (D) 300    (E) 350

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6. When water freezes, the ice occupies a volume 9% greater than that of the water. How much water must be frozen to make  $872 \text{ m}^3$  of ice?

- (A)  $800 \text{ m}^3$     (B)  $880 \text{ m}^3$     (C)  $950 \text{ m}^3$     (D)  $990 \text{ m}^3$     (E) None of these
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7. On his last two exams, John had an average mark of 55%. If he had doubled his mark on the first exam, he would have had an average of 75%. What mark did he get on his first exam?

- (A) 20    (B) 40    (C) 65    (D) 70    (E) None of these
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8. How many ice cubes of size 3 cm on each side does it take to build a solid rectangular box which is 60 cm long, 33 cm wide, and 30 cm high?

- (A) 550    (B) 1100    (C) 2200    (D) 3300    (E) None of these
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9. A fence whose length is 18 m encloses a rectangular field. If the length of the field is twice the width, the area of the field is

- (A)  $18 \text{ m}^2$     (B)  $21 \text{ m}^2$     (C)  $24 \text{ m}^2$     (D)  $32 \text{ m}^2$     (E) None of these
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10. Martin purchases 2 apples and 4 oranges. Michelle purchases 8 apples and two oranges. If Michelle pays twice as much as Martin, how many apples can be purchased for the price of nine oranges?

- (A) 4    (B) 5    (C) 6    (D) 7    (E) Not enough information
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**PART B**

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11. Donald can pick 25% more apples than Roman in the same amount of time. If together they can pick 90 apples in an hour, how long would it take Donald to pick 120 apples?
- (A) 2 hours      (B) 2 hours & 24 minutes      (C) 2 hours & 40 minutes      (D) 3 hours  
(E) None of these
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12. Twenty-eight students in a class each select 2 gloves from a box containing red and green gloves. If 20 students have gloves that are both the same colour, how many students have at least one green glove?
- (A) 8      (B) 15      (C) 20      (D) 28      (E) Not enough information
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13. How many integers can be constructed using the digits 1, 2, 3, 4, (for example, 132, 31, 1423), if each digit can be used at most once in a given integer?
- (A) 24      (B) 28      (C) 32      (D) 36      (E) None of these
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14. What is the next term in the sequence 1, 3, 5, 11, 21, 43 ...?
- (A) 64      (B) 78      (C) 85      (D) 87      (E) 100
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15. Mr. A purchased an automobile. He added 20% to his cost and sold the automobile to Miss B. Miss B added 25% to the price that she paid and sold the same automobile to Mr. C who paid \$6000. How much did Mr. A pay for the automobile?
- (A) \$3300      (B) \$3600      (C) \$3800      (D) \$4000      (E) None of these
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16. Robert builds a wall made from bricks. Each layer has exactly three more bricks than the layer immediately above it. If the wall has five layers, how many bricks will the top layer have if the total number of bricks in the wall is 80?
- (A) 10      (B) 13      (C) 16      (D) 22      (E) None of these
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17. Which of the following numbers can not be expressed as the sum of exactly 3 different numbers from the set: {3, 7, 15, 19, 28, 33}?
- (A) 38      (B) 44      (C) 55      (D) 67      (E) None of these
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18. An organization has 32 members. It hopes to increase the membership by 50% each year. If this is done, how many members will the organization have in 5 years?

- (A) 112      (B) 162      (C) 200      (D) 243      (E) None of these
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19. A ship sails 14 km due east, 5 km due north, 10 km due west and 8 km due south. How far will the ship be from its original starting point?

- (A) 5 km      (B) 7 km      (C) 10 km      (D) 25 km      (E) None of these
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20. Julie carries out a sequence of calculations on her calculator which shows an answer of 27.42. She realizes that on the last operation, she has multiplied by .1 instead of dividing by .1, and on the operation previous to that, she had added 2 instead of subtracting 2. What would the answer have been if she had not made these two errors?

- (A) 254.2      (B) 272.2      (C) 2702      (D) 2720      (E) Not enough information
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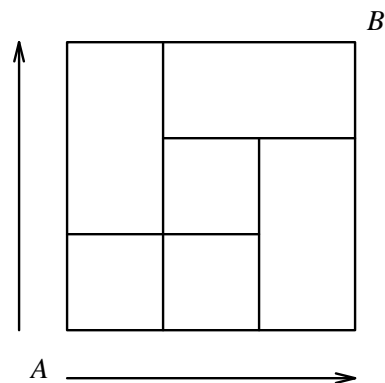
**PART C**


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21. What is the digit in the ones' place in the expansion of  $3^{47}$ ?

- (A) 1    (B) 3    (C) 5    (D) 7    (E) 9
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22. How many different routes are there from point  $A$  to point  $B$ ? The arrows indicate the direction that must be followed.



- (A) 5    (B) 7    (C) 9    (D) 10    (E) None of these
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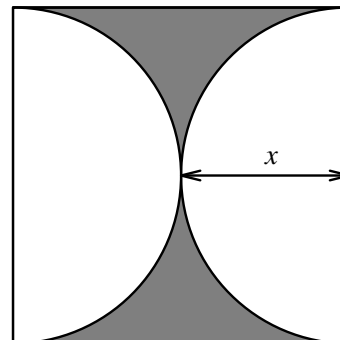
23. In the game of 6\*9, a person chooses 6 different integers from 1 to 9. If the order in which the numbers are chosen is not important, how many choices are possible?

- (A) 36    (B) 54    (C) 84    (D) 504    (E) 720
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24. A carpenter builds a hollow wooden box using wood that is 1 cm thick. How much wood does he use in building a box whose shape is a cube with exterior dimensions of 5 cm on each side?

- (A)  $61 \text{ cm}^3$     (B)  $64 \text{ cm}^3$     (C)  $98 \text{ cm}^3$     (D)  $125 \text{ cm}^3$     (E) Not enough information
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25. In the figure shown at the right, two tangent semi-circles with a radius equal to  $x$  are inscribed in a square. What is the area of the shaded region?



- (A)  $4x^2$     (B)  $\pi x^2$     (C)  $(2 - \pi)x^2$     (D)  $(4 - \pi)x^2$     (E) Not enough information
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26. The sum of two numbers is 11 and the product of the two numbers is 33. What is the sum of the squares of the two numbers?

- (A) 22    (B) 33    (C) 44    (D) 55    (E) Not enough information
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