

UNIVERSITY OF NEW BRUNSWICK  
and  
UNIVERSITÉ DE MONCTON

NEW BRUNSWICK MATHEMATICS COMPETITION

May 23, 1997

GRADE 7

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PART A

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1. What is the value of  $\frac{1}{2} - \frac{1}{3} + \frac{1}{6} - \frac{1}{18}$ ?

- (A) 0      (B)  $\frac{1}{18}$       (C)  $\frac{1}{6}$       (D)  $\frac{5}{18}$       (E)  $\frac{1}{3}$
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2. A clock is set correctly at 1:00 p.m.. It loses 3 minutes during every hour. What will the clock read when the correct time is 10:00 a.m. the next day?

- (A) 8:57      (B) 9:03      (C) 10:00      (D) 11:03      (E) None of these
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3. In a tournament where each team meets every other team twice, a total of 30 games are played. How many teams play in this tournament?

- (A) 4      (B) 5      (C) 6      (D) 7      (E) 15
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4. An orchestra has 30 musicians. Twelve of them can play the flute and twelve of them can play the trumpet. Six of them can play both. How many of the musicians can not play either of these instruments?

- (A) 0      (B) 6      (C) 12      (D) 15      (E) None of these
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5. 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
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6. In the game of baseball, a player's batting average is obtained by dividing the number of hits by the number of times at bat. A player has already had 100 hits in 400 times at bat. If he still has 200 more times at bat until the end of the season, how many more hits does he need in order to end the season with a batting average of 0.300?

- (A) 60      (B) 80      (C) 120      (D) 180      (E) None of these
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7. What is the value of the expression  $\frac{1}{1 + \frac{1}{1+1}} + \frac{1}{2 + \frac{3}{4+5}}$  ?

- (A)  $\frac{5}{10}$       (B)  $\frac{11}{24}$       (C)  $\frac{23}{21}$       (D)  $\frac{11}{7}$       (E) None of these
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8. Paul is 5 years younger than Roman and Jules is 10 years younger than the sum of Paul's and Roman's ages. How old is Roman if the three ages add up to 80 years?

- (A) 20      (B) 25      (C) 30      (D) 35      (E) 40
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9. The speed of light is 300000 km/sec and the planet Pluto is located at a distance of 6 billion km from Earth. If a spaceship, traveling at a constant speed in a straight line, goes from Earth to Pluto in 100 hours, at what fraction of the speed of light is this spaceship traveling?

- (A)  $\frac{6}{100}$       (B)  $\frac{1}{18}$       (C)  $\frac{1}{180}$       (D)  $\frac{1}{1080}$       (E) None of these
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10. Of the following, which is the closest estimate of  $\sqrt{\frac{1997}{10000}}$  ?

- (A) .0044      (B) .0141      (C) .0446      (D) .1411      (E) .4469
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## PART B

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11. Find the missing term in the sequence:

1   2   5   12   ?   58

(A) 24      (B) 27      (C) 28      (D) 33      (E) None of these

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12. A city's population increased from 24000 to 25000 during 1993. If the increase in population decreased by 100 in each of the following three years, what was the population of this city at the end of 1996?

(A) 24700      (B) 27400      (C) 27700      (D) 27900      (E) None of these

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13. How many two digit numbers are there for which both of the digits are even?

(A) 20      (B) 25      (C) 45      (D) 50      (E) None of these

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14. How many digits does the number  $2^1 \times 3^2 \times 4^3 \times 5^4$  have?

(A) 5      (B) 6      (C) 7      (D) 8      (E) None of these

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15. If  $a * b = a^2 + \frac{1}{b}$ , find the value of  $3 * 5$ .

(A)  $\frac{9}{5}$       (B)  $\frac{46}{5}$       (C) 15      (D)  $\frac{76}{3}$       (E) None of these

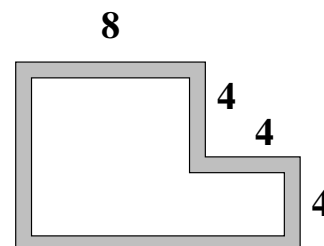
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16. A farmer plants trees in rows in a rectangular field. If each row has three times as many trees as there are rows and if there are 972 trees in the field, how many trees are there in each row?

(A) 18      (B) 27      (C) 36      (D) 54      (E) None of these

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17. If the shaded region has a constant width of 1 unit, what is the difference between the areas of the non-shaded region and the shaded region?



(A) 0      (B) 4      (C) 8      (D) 12      (E) None of these

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18. A fruit shop sells apples for 5 cents each, oranges for 10 cents each and bananas for 25 cents each. If you spend exactly 55 cents at the shop, how many distinct purchases of exactly two kinds of fruit can you make?

(A) 7      (B) 8      (C) 9      (D) 14      (E) 18

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19. You are selling video games of two types,  $A$  and  $B$ . The first day, you sell 3 games of type  $A$  and 5 of type  $B$  for a total of \$450. The second day, you decrease the price of type  $A$  games by \$20 and you increase the price of type  $B$  games by \$10. You then sell 5 games of type  $A$  and 4 games of type  $B$  for a total of \$430. What was the price of the type  $A$  games on the second day?

(A) \$30      (B) \$40      (C) \$50      (D) \$60      (E) \$70

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20. A moving sidewalk travels at 4 km/h. A pedestrian walking at 6 km/h covers 1 km on the sidewalk going in the same direction as the sidewalk and then comes back to the starting point walking in the opposite direction from the movement of the sidewalk. How long does the round trip take?

(A) 10 min      (B) 20 min      (C) 30 min      (D) 36 min      (E) None of these

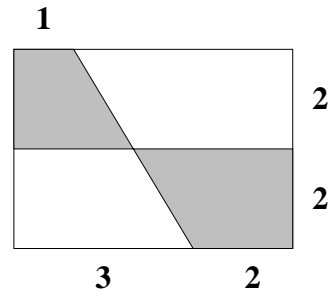
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**PART C**

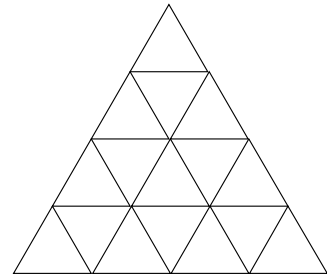
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21. What is the area of the shaded region?



- (A) 6      (B) 8      (C) 10      (D) 12      (E) Not enough information
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22. How many triangles are there in the figure shown at the right?



- (A) 16      (B) 26      (C) 27      (D) 32      (E) None of these
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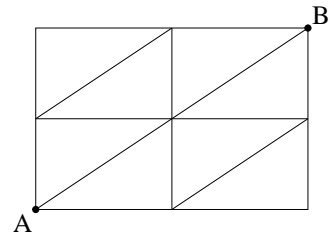
23. What is the last digit of the number  $2^{1997}$ ?

- (A) 0      (B) 2      (C) 4      (D) 6      (E) 8
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24. Three pipes can be used to fill a tank. It is filled in 10 hours using only the first pipe, in 12 hours using only the second pipe and in 15 hours using only the third one. A pressure problem cuts the flow capacity of each pipe in half. It is then decided to use the three pipes together. How long will it take to fill the tank?

- (A) 4 hrs      (B) 5 hrs      (C) 8 hrs      (D) 12 hrs      (E) None of these
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25. How many different paths are there from  $A$  to  $B$  if you are only allowed to move “right”, “up” or “right-and-up” at each step?



- (A) 6      (B) 11      (C) 13      (D) 14      (E) 15
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26. How many integers between 1 and 1000 (inclusive) do not contain the digits 8 or 9?

- (A) 200      (B) 488      (C) 512      (D) 521      (E) 800
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