

UNIVERSITY OF NEW BRUNSWICK
and
UNIVERSITÉ DE MONCTON

NEW BRUNSWICK MATHEMATICS COMPETITION

May 14, 1999

GRADE 7

PART A

1. What is the value of $\frac{1}{1 + \frac{1}{2+1}}$?

- (A) $\frac{2}{3}$ (B) $\frac{3}{4}$ (C) 1 (D) $\frac{4}{3}$ (E) $\frac{3}{2}$
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2. A public monument was constructed by 30 workers in 36 years. How many years would it take 120 workers to construct the same monument?

- (A) 3 (B) 4 (C) 9 (D) 100 (E) 144
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3. In 1998, I planted 100 tulips in my garden. Each year, the number of tulips doubles. In what year will my garden contain 1000 or more tulips?

- (A) 2001 (B) 2002 (C) 2003 (D) 2004 (E) 2008
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4. When 5 new girls joined a class the percentage of girl students increased from 40% to 50%. The number of boys in the class is given by

- (A) 5 (B) 10 (C) 12 (D) 15 (E) None of these
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5. A planet takes a third of the time required for the earth to complete one revolution about its axis. How many days will there be on this planet during one week on earth?

- (A) $\frac{7}{3}$ (B) 7 (C) 10 (D) 21 (E) None of these
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6. A club consists of five members: {André, Béatrice, Claude, Denis, Édith}. How many ways can a president and secretary be elected if the same person cannot hold both jobs?

- (A) 5 (B) 10 (C) 20 (D) 25 (E) None of these
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PART B

11. Which of the following expressions is the largest?

- (A) 1 (B) $\frac{1}{\frac{1}{2} + \frac{1}{3}}$ (C) $\left(1 + \frac{1}{10}\right)^3$ (D) $\frac{1 + \frac{1}{6}}{1 - \frac{1}{6}}$ (E) $\left(1 - \frac{1}{10}\right)^3$
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12. Rain falls all night over a lake. The total rainfall is 50 litres per square meter. By how much does the surface of the lake rise?

- (A) .05m (B) .5m (C) 5m (D) 50m (E) None of these
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13. If our days were divided into 10 hours (with no need for a.m. and p.m.), the new hours into 100 minutes and the new minutes into 100 seconds, what new time would it be at 6 p.m.?

- (A) 6:00 (B) 6:48 (C) 7:00 (D) 9:00 (E) None of these
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14. How many seconds will it take for a train 300 meters long travelling at 100 km/hr to pass a man jogging at 10 km/hr in the same direction?

- (A) 9.8 (B) 10.8 (C) 12 (D) 15 (E) None of these
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15. If $a * b = \frac{a}{b} + \frac{b}{a}$ find the value of $(1 * 2) * 3$.

- (A) $\frac{1}{2}$ (B) $\frac{13}{6}$ (C) $\frac{5}{2}$ (D) $\frac{61}{30}$ (E) 6
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16. A total of fifteen delegates from Israel, Palestine, Russia and the United States meet at a conference. Each of these countries has sent a different number of delegates (with each country sending at least one delegate). Israel and Russia have sent a combined total of six delegates. Russia and the United States have sent a combined total of seven. One country has sent four delegates. Which one was it?

- (A) Russia (B) Palestine (C) United States (D) Israel (E) Not enough information
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17. Find the missing term in the following sequence of numbers: 2, 14, ?, 686, 4802,

- (A) 16 (B) 28 (C) 98 (D) 100 (E) None of these
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18. Ten pennies and ten nickels were arranged alternatively as PNP...PN. A move consists of exchanging the position of two adjacent coins. What is the minimum number of moves needed to move all the pennies to one end, and all of the nickels to the other end, i.e., PPP...PN...NNN?

- (A) 10 (B) 20 (C) 25 (D) 40 (E) 45
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19. A , B and C are three numbers. If $C - 2A = 50$ and $B + 3A = 10$, then the average of the three numbers is

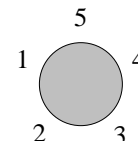
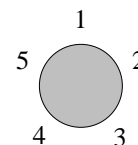
- (A) 20 (B) 30 (C) 40 (D) 50 (E) Not enough information
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20. A hummingbird beats its wings 60 times per second. How many times does it beat its wings in one week?

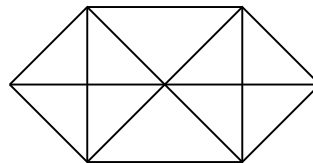
- (A) 96 000 (B) 216 000 (C) 5 184 000 (D) 36 288 000 (E) None of these
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PART C

21. Five persons sit around a circular table. How many different seating arrangements are there? Two seating arrangements are the same if each person is seated between the same pair of persons in both arrangements. For example, the two seating arrangements shown are the same.



- (A) 5 (B) 6 (C) 10 (D) 12 (E) None of these
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22. How many triangles are there in the figure shown at the right?

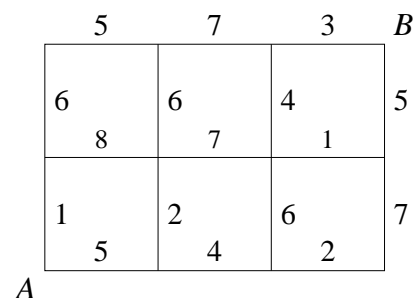


- (A) 10 (B) 14 (C) 18 (D) 22 (E) None of these
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23. What is the value of the sum:

$$1 + 3 - 5 - 7 + 9 + 11 - 13 - 15 + 17 + \dots - 79 + 81?$$

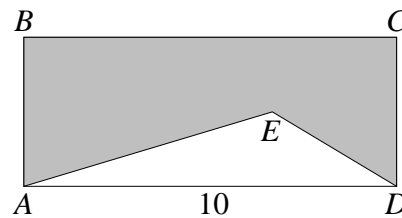
- (A) -1 (B) 1 (C) 80 (D) 82 (E) None of these
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24. The faces of a cube are marked with the numbers 1, 2, 3, 4, 5, 6. Each corner of the cube is assigned "vertex number" equal to the sum of all the numbers on the faces that meet at this corner. The sum of all the vertex numbers is

- (A) 21 (B) 42 (C) 63 (D) 84 (E) None of these
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25. The map shows the cost of travelling through each section of road. What is the lowest possible cost for going from point *A* to point *B*?



- (A) 17 (B) 18 (C) 19 (D) 20 (E) 21
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26. In the diagram, the rectangle $ABCD$ has a width of 10 cm and a height of 8 cm. The height of the triangle ADE is 4 cm. The shaded area, in cm^2 , is



- (A) 20 (B) 40 (C) 60 (D) 80 (E) 100
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