UNIVERSITY OF NEW BRUNSWICK
and
UNIVERSITÉ DE MONCTON

JUNIOR HIGH SCHOOL MATHEMATICS COMPETITION

May 24, 1996

GRADE 9

PART A

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1. A teacher lines up all of the 30 students in a class in a row. It is found that the largest number of boys consecutively is 4. What is the maximum number of boys in the class?

   (A) 15   (B) 23   (C) 24   (D) 25   (E) None of these

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2. A three digit number is between 130 and 200. It is divisible by 6 and 8. The tens digit is greater than the ones digit. What is the number?

   (A) 144   (B) 168   (C) 184   (D) 192   (E) 196

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3. A water tank contains 48 liters when it is half full. How much water needs to be added so that it will be $\frac{2}{3}$ full?

   (A) 16   (B) 18   (C) 20   (D) 22   (E) 24

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4. An employer pays one and a half times the hourly rate for each hour worked in excess of 8 hours. If an employee works 10 hours, by what percent are the wages of an 8 hour day increased?

   (A) 25%   (B) 32.5%   (C) 37.5%   (D) 40%   (E) None of these

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5. If the ratio of a to b is 2:3 and the ratio of b to c is 4:5, find the ratio of a to c.

   (A) 8:45   (B) 8:37   (C) 8:15   (D) 6:9   (E) None of these

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6. The lengths of two sides of a triangle are 5 and 13. How many integers are possible values for the length of the third side?

(A) 1   (B) 9   (C) 10   (D) 11   (E) 12

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7. A wall which is 9.1 meters long is divided by 10 evenly spaced 10 cm square posts (including the posts on the corners). How many cm wide is the space between consecutive posts?

(A) 81   (B) 90   (C) 91   (D) 100   (E) None of these

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8. A dog chases a rabbit which starts 50 meters ahead of the dog. The dog jumps 2 meters every time the rabbit jumps 1.6 meters. In how many leaps will the dog catch the rabbit?

(A) 25   (B) 100   (C) 125   (D) 150   (E) None of these

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9. Parking rates at an airport parking lot are as follows:

0-1 hours	$1.25
Each additional hour	$0.50
Maximum for each 24 hour period	$3.50

What is the fee for parking from 3:30 p.m. on Friday to 11:00 p.m. on the following Sunday?

(A) $10.50   (B) $11.00   (C) $12.25   (D) $13.50   (E) None of these

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10. A train triggers a warning bell when it is $\frac{1}{4}$ kilometer from a crossing. If the speed of the train is 45 kph, how many seconds after the bell is triggered will the train reach the crossing?
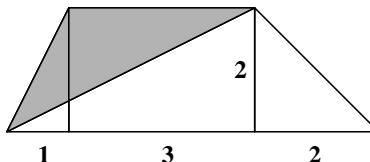
(A) 15   (B) 20   (C) 30   (D) 60   (E) None of these

PART B

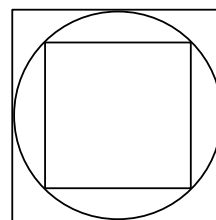11. How many fractions whose denominator is 23 have values between .18 and .82?

    (A) 13   (B) 14   (C) 15   (D) 16   (E) 17

12. What is the area of the shaded region?

    (A) 2   (B) 3   (C) 4   (D) 5   (E) 6

13. If the radius of the circle is 1, what is the area of the region located between the 2 squares?

    (A) 1   (B) $\sqrt{2}$ (C) 2   (D) 4   (E) None of these

14. Which number is closest in size to the volume of a standard chicken egg?

    (A) 7 cm^3 (B) 70 cm^3 (C) 700 cm^3 (D) .07 m^3 (E) .7 cm^3

15. Evaluate: $\sqrt{5^5 + 5^5 + 5^5 + 5^5 + 5^5}$.

    (A) $5\sqrt{5}$ (B) 25   (C) $25\sqrt{5}$ (D) 125   (E) 625

16. Find $A + B + C$, if A is 25% of 40, 10 is 25% of B, and 10 is C% of 40.

    (A) 50   (B) 65   (C) 70   (D) 75   (E) 80

17. How many two digit numbers are equal to seven times the sum of their digits?

    (A) 0   (B) 1   (C) 2   (D) 3   (E) 4

18. In Canada we use coins of the following denominations: $0.01, $0.05, $0.10, $0.25, $1 and $2. In how many ways can we obtain a sum of $3.15 using exactly 10 coins?

    (A) 1   (B) 2   (C) 3   (D) 4   (E) It is not possible

19. When the 171st positive even integer is subtracted from the 220th positive odd integer the result is Z. Determine Z.

    (A) 48   (B) 49   (C) 97   (D) 99   (E) None of these

20. All of the positive integers less than 49 are multiplied together. How many zeros will this product end in?

    (A) 5   (B) 9   (C) 10   (D) 48   (E) 49

PART C

21. A car dealer sells 3 types of car. On the first day, he sells 3 cars of model A and 2 of model B for a sum of $260 000. On the second day, he sells 3 cars of model B and 2 cars of model C for a sum of $160 000, and on the third day, he sells 3 cars of model C and 2 cars of model A for a total of $180 000. What is the price of one model C car?

    (A) $20 000   (B) $30 000   (C) $40 000   (D) $50 000   (E) $60 000

22. If steps are allowed only to the right or up, how many distinct paths are there between **A** and **B**?
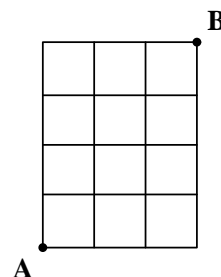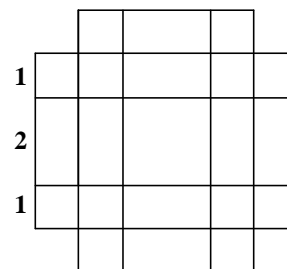
    (A) 12   (B) 32   (C) 35   (D) 36   (E) 40

23. In the towns of Sirius and Deneb it is the season for weddings. There are 3 boys and 2 girls in Sirius as well as 2 boys and 3 girls in Deneb who are ready to be married. If a person cannot marry someone from their own village, how many distinct weddings are possible?

    (A) 5   (B) 12   (C) 13   (D) 36   (E) 108

24. How many squares are there in the following symmetric diagram?

    (A) 12   (B) 17   (C) 21   (D) 22   (E) 26

25. On the planet Pluto, plouks have 2 heads and 3 legs and zuves have 1 head and 4 legs. A tall plutonian observes 10 heads by looking over a fence. A small plutonian looking under the same fence observes 25 legs. How many plouks there are behind this fence?

    (A) 2   (B) 3   (C) 4   (D) 5   (E) 6

26. Find the sum of all the integers x for which $2000 < 5^{x-1} < 20,000$.

    (A) 4   (B) 6   (C) 9   (D) 11   (E) None of these