UNIVERSITY OF NEW BRUNSWICK
and
UNIVERSITÉ DE MONCTON

JUNIOR HIGH SCHOOL MATHEMATICS COMPETITION

May 13, 1994

GRADE 7

PART A

1. Which of the following numbers is the smallest?

   (A) 7% of 7 (B) 2% of 25 (C) 30% of 2 (D) 9% of 6 (E) 1% of 60

2. If $\mathcal{F}$ = the set of letters in the word WESTERN,
   $\mathcal{R}$ = the set of letters in the word PARENT,
   $\mathcal{P}$ = the set of letters in the word WAGON,

   evaluate the set $(\mathcal{F} \cup \mathcal{R}) \cap \mathcal{P}$.

   (A) {N} (B) {E,N,R,T} (C) {N,W} (D) {W,A,N} (E) {A,N}

3. In Egyptian hieroglyphic writing, $1 = 1$, $\cap = 10$, $\Xi = 100$, $\Delta = 1\,000$, and $\Upsilon = 10\,000$. What is the number shown at right equal to?

   $\Upsilon\ \Delta\ \Xi\Xi\ \cap\cap\ 11$
   $\Xi\ \ \cap\cap$

   (A) 11942 (B) 24911 (C) 11342 (D) 24311 (E) None of these

4. The value of a stock inceases by 1 3/8 points on Monday, decreases by 1/4 of a point on Tuesday, increases by 3/8 of a point on Wednesday and by 2 points on Thursday and finally decreases by 1 1/4 points on Friday. What is the net change in the value of the stock during the week?

   (A) $+1\frac{3}{4}$ (B) $-1\frac{3}{4}$ (C) -2 (D) $2\frac{1}{4}$ (E) $1\frac{1}{8}$

5. If a worker can wax a car in 40 minutes, how many cars can the worker completely wax in a working day of 7 1/2 hours?

   (A) 7 (B) 8 (C) 9 (D) 10 (E) 11

6. From each amount of \$450 obtained from selling eyeglasses, the salesperson keeps \$45 and gives the remainder to their employer. How much were the total sales if the salesperson gives \$1000 to their employer?

   (A) \$111.11 (B) \$855 (C) \$900 (D) \$955 (E) \$1111.11

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7. Anne, Marie and Felicia each play the piano. Susie and Karine play the violin. How many pairs can be made consisting of one pianist and one violinist?

   (A) 1 (B) 3 (C) 4 (D) 5 (E) 6

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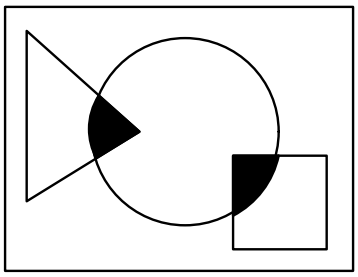
8. A = circle, B = triangle, C = square. What is the expression for the shaded area in the figure shown?



   (A) $A \cap B \cap C$ (B) $A \cup B \cup C$ (C) $A \cup (B \cap C)$ (D) $A \cap (B \cup C)$ (E) None of these

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9. If the income tax on your earnings is \$1380 plus 20% of the amount in excess of \$8000, how much tax would you pay on earnings of \$10200?

   (A) \$220 (B) \$440 (C) \$1820 (D) \$2200 (E) \$3420

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10. A farmer needs 3 1/2 bags of corn to plant 5 hectares. If a bag of corn costs \$19, how much will it cost to plant one hectare?

    (A) \$0.70 (B) \$3.80 (C) \$7.00 (D) \$13.00 (E) \$13.30

PART B

11. In a class of 100 students, it is known that 45 study mathematics, 26 study chemistry and 27 study physics. It is also known that 19 of the students study both mathematics and chemistry, 8 study mathematics and physics, 10 study chemistry and physics, and 3 students study mathematics, chemistry and physics. How many of these students study only chemistry.

(A) 0 (B) 3 (C) 7 (D) 16 (E) Not enough information

12. Calculate: $1 + \dfrac{1}{2 + \frac{1}{3 + \frac{1}{4 + \frac{1}{5}}}}$.

(A) $\dfrac{1}{15}$ (B) $\dfrac{60}{137}$ (C) $\dfrac{157}{225}$ (D) $\dfrac{225}{157}$ (E) $\dfrac{137}{60}$

13. Dolores' children wish to share equally in the cost of buying a present for their mother. If they each contribute \$2.00, there is \$1.00 left over after the present is bought. If they each contribute \$1.50, then they are \$1.00 short of the amount necessary to buy the present. How much does the present cost?

(A) \$4 (B) \$6 (C) \$7 (D) \$10 (E) \$12

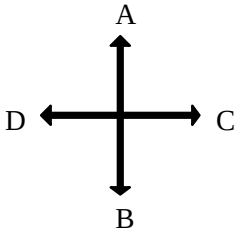
14. A bottleneck due to an accident on a highway produces two lines of cars each having a length of 720 metres. If the average distance between cars is 2.50 metres and the average length of a car is 3.50 metres, how many cars are there?

(A) 120 (B) 122 (C) 240 (D) 242 (E) None of these

15. A basketball team has 5 players. If each player shakes hands with each of their teammates before the match, how many handshakes are there?

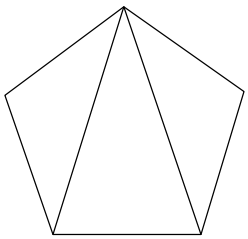
(A) 5 (B) 10 (C) 20 (D) 24 (E) None of these

16. Suppose that A, B, C, D represent steps of equal length in each of the directions indicated. If $3A2B1C$ denotes three steps in the A direction, followed by two steps in the B direction and then one step in the C direction, then the sequence ends at the same place as



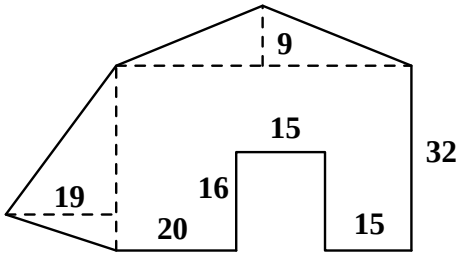
(A) $2A1B3D2C$ (B) $3B3C2A2D$ (C) $1A2D3C$ (D) $2B1A1D$ (E) None of these

17. The diagram shows a regular pentagon with two of its diagonals. If all of the diagonals were drawn in, into how many areas will the pentagon be divided?



(A) 4 (B) 5 (C) 8 (D) 10 (E) 11

18. Find the surface area of the figure shown:



(A) 1804 (B) 1889 (C) 2004 (D) 2039 (E) None of these

19. A student receives grades on four examinations of 75, 82, 71 and 84. What grade does the student need on the fifth examination to raise their average to 80?

(A) 80 (B) 82 (C) 86 (D) 88 (E) 90

20. In the game of Martian Ball, scores are made in two ways: Kick and Throw. A Kick is worth three times as much as a Throw. Which of the following scores can not be worth as much as 12 Kicks and 7 Throws?

(A) 1 Kick 40 Throws (B) 3 Kicks 34 Throws (C) 6 Kicks 24 Throws

(D) 13 Kicks 4 Throws (E) Not enough information

PART C

21. If $x^*y = (x+1)/(y+1)$, what is the value of $0^*((1^*2)^*(3^*4))$?

(A) 0 (B) $\frac{1}{6}$ (C) $\frac{27}{52}$ (D) $\frac{11}{12}$ (E) 36

22. Evaluate

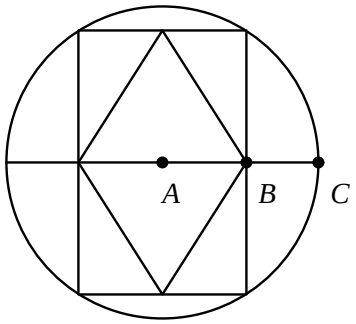
$$\frac{(100-99)(100-98)....(100-3)(100-2)(100-1)}{(1+2)(1+3)....(1+98)(1+99)(1+100)}$$

(A) $\frac{1.96}{101}$ (B) 0.998 (C) $\frac{(100)^2}{(99)^2}$ (D) 50.55 (E) None of these

23. If the operation F is applied to an odd integer, the result is one plus three times that integer. When F is applied to an even integer, the result is that integer divided by two. What is the result of applying the operation F ninety-nine times in a row starting with the number 5?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 99

24. A diamond is inscribed in a rectangle which is in turn inscribed in a circle. Find the length of the side of the diamond if the segments AB and BC measure 5 cm and 4 cm respectively.



(A) $\sqrt{41}$ (B) 9 (C) $\sqrt{97}$ (D) $\sqrt{106}$ (E) Not enough information

25. The grid at the right can be filled up using only the numbers 1, 2, 3, 4 and 5 so that each number appears just once in a row, once in each column, and once in each diagonal. Which number goes in the centre square?

3	**4**			**5**
2				
				4

(A) 1 (B) 2 (C) 3 (D) 4 (E) Not enough information

26. There are 120 people staying at the STAR Hotel. The ratio of adults to children is 3:2. The ratio of females to males is 5:1 for adults and 1:1 for children. How many adult males are staying at the hotel?

(A) 12 (B) 24 (C) 36 (D) 48 (E) 72