Canadian Mathematics Competition

An activity of the Centre for Education in Mathematics and Computing, University of Waterloo, Waterloo, Ontario

Gauss Contest (Grade 7)

(The Grade 8 Contest is on the reverse side)

Wednesday, May 16, 2007

C.M.C. Sponsors

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Time: 1 hour

Calculators are permitted.

Instructions

1. Do not open the contest booklet until you are told to do so.
2. You may use rulers, compasses and paper for rough work.
3. Be sure that you understand the coding system for your answer sheet. If you are not sure, ask your teacher to explain it.
4. This is a multiple-choice test. Each question is followed by five possible answers marked **A**, **B**, **C**, **D**, and **E**. Only one of these is correct. When you have made your choice, enter the appropriate letter for that question on your answer sheet.
5. Scoring: Each correct answer is worth 5 in Part A, 6 in Part B, and 8 in Part C.
   There is *no penalty* for an incorrect answer.
   Each unanswered question is worth 2, to a maximum of 10 unanswered questions.
6. Diagrams are *not* drawn to scale. They are intended as aids only.
7. When your supervisor instructs you to start, you will have *sixty* minutes of working time.

The names of some top-scoring students will be published in the Gauss Report on our Web site, http://www.cemc.uwaterloo.ca.

Please see our Web site http://www.cemc.uwaterloo.ca for copies of past Contests and for information on publications which are excellent resources for enrichment, problem solving and contest preparation.

Scoring: There is *no penalty* for an incorrect answer.
Each unanswered question is worth 2, to a maximum of 10 unanswered questions.

Part A: Each correct answer is worth 5.

1. The value of $(4-3)\times 2$ is
(A) -2 **(B)** 2 **(C)** 1 **(D)** 3 **(E)** 5

2. Which number represents ten thousand?
(A) 10 **(B)** 10 000 000 **(C)** 10 000 **(D)** 100 **(E)** 1 000

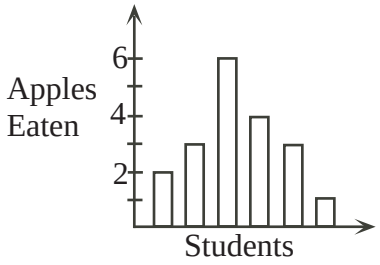
3. What integer should be placed in the $\square$ to make the statement $\square - 5 = 2$ true?
(A) 7 **(B)** 4 **(C)** 3 **(D)** 1 **(E)** 8

4. If Mukesh got 80% on a test which has a total of 50 marks, how many marks did he get?
(A) 40 **(B)** 62.5 **(C)** 10 **(D)** 45 **(E)** 35

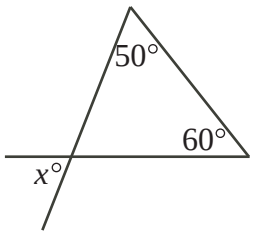
5. The sum $\frac{7}{10}+\frac{3}{100}+\frac{9}{1000}$ is equal to
(A) 0.937 **(B)** 0.9037 **(C)** 0.7309 **(D)** 0.739 **(E)** 0.0739

6. Mark has $\frac{3}{4}$ of a dollar and Carolyn has $\frac{3}{10}$ of a dollar. Together they have
(A) \$0.90 **(B)** \$0.95 **(C)** \$1.00 **(D)** \$1.10 **(E)** \$1.05

7. Six students have an apple eating contest. The graph shows the number of apples eaten by each student. Lorenzo ate the most apples and Jo ate the fewest. How many more apples did Lorenzo eat than Jo?
(A) 2 **(B)** 5 **(C)** 4
(D) 3 **(E)** 6



8. In the diagram, what is the value of x?
(A) 110 **(B)** 50 **(C)** 10
(D) 60 **(E)** 70



9. The word BANK is painted exactly as shown on the outside of a clear glass window. Looking out through the window from the inside of the building, the word appears as
(A) ВАИЖ **(B)** KNAB **(C)** ЯАИЖ **(D)** ЖИАЯ **(E)** KNAB

10. A large box of chocolates and a small box of chocolates together cost \$15. If the large box costs \$3 more than the small box, what is the price of the small box of chocolates?
(A) \$3 **(B)** \$4 **(C)** \$5 **(D)** \$6 **(E)** \$9

Part B: Each correct answer is worth 6.

11. In the Fibonacci sequence 1, 1, 2, 3, 5, ..., each number beginning with the 2 is the sum of the two numbers before it. For example, the next number in the sequence is $3 + 5 = 8$. Which of the following numbers is in the sequence?

    (A) 20 **(B)** 21 **(C)** 22 **(D)** 23 **(E)** 24

12. The Grade 7 class at Gauss Public School has sold 120 tickets for a lottery. One winning ticket will be drawn. If the probability of one of Mary's tickets being drawn is $\frac{1}{15}$, how many tickets did she buy?

    (A) 5 **(B)** 6 **(C)** 7 **(D)** 8 **(E)** 9

13. What is the largest amount of postage in cents that *cannot* be made using only 3 cent and 5 cent stamps?

    (A) 7 **(B)** 13 **(C)** 4 **(D)** 8 **(E)** 9

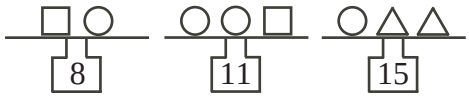
14. Harry, Ron and Neville are having a race on their broomsticks. If there are no ties, in how many different possible orders can they finish?

    (A) 7 **(B)** 6 **(C)** 5 **(D)** 4 **(E)** 3

15. How many positive whole numbers, including 1, divide exactly into both 40 and 72?

    (A) 9 **(B)** 12 **(C)** 4 **(D)** 2 **(E)** 5

16. In the diagram, each scale shows the total mass (weight) of the shapes on that scale. What is the mass (weight) of a △ ?



    (A) 3 **(B)** 5 **(C)** 12 **(D)** 6 **(E)** 5.5

17. To rent a kayak and a paddle, there is a fixed fee to use the paddle, plus a charge of \$5 per hour to use the kayak. For a three hour rental, the total cost is \$30. What is the total cost for a six hour rental?

    (A) \$50 **(B)** \$15 **(C)** \$45 **(D)** \$60 **(E)** \$90

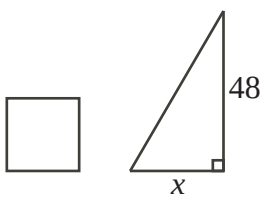
18. Fred's birthday was on a Monday and was exactly 37 days after Pat's birthday. Julie's birthday was 67 days before Pat's birthday. On what day of the week was Julie's birthday?

    (A) Saturday **(B)** Sunday **(C)** Monday **(D)** Tuesday **(E)** Wednesday

19. The whole numbers from 1 to 1000 are written. How many of these numbers have at least two 7's appearing side-by-side?

    (A) 10 **(B)** 11 **(C)** 21 **(D)** 30 **(E)** 19

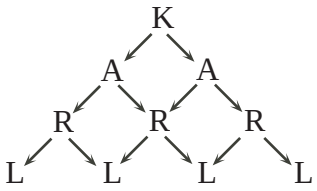
20. In the diagram, the square has a perimeter of 48 and the triangle has a height of 48. If the square and the triangle have the same area, what is the value of x?



    (A) 1.5 **(B)** 12 **(C)** 6 **(D)** 3 **(E)** 24

Part C: Each correct answer is worth 8.

21. In the diagram, how many paths can be taken to spell "KARL"?

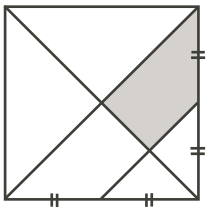


(A) 4 **(B)** 16 **(C)** 6 **(D)** 8 **(E)** 14

22. The average of four different positive whole numbers is 4. If the difference between the largest and smallest of these numbers is as large as possible, what is the average of the other two numbers?

(A) $1\frac{1}{2}$ **(B)** $2\frac{1}{2}$ **(C)** 4 **(D)** 5 **(E)** 2

23. A square is divided, as shown. What fraction of the area of the square is shaded?



(A) $\frac{1}{4}$ **(B)** $\frac{1}{8}$ **(C)** $\frac{3}{16}$ **(D)** $\frac{1}{6}$ **(E)** $\frac{3}{32}$

24. In the multiplication shown, P, Q and R are all different digits so that

$$\begin{array}{r} PPQ \\ \times \quad Q \\ \hline RQ\,5\,Q \end{array}$$

What is the value of $P + Q + R$?

(A) 20 **(B)** 13 **(C)** 15 **(D)** 16 **(E)** 17

25. The CMC reception desk has a tray in which to stack letters as they arrive. Starting at 12:00, the following process repeats every five minutes:

- Step 1 – Three letters arrive at the reception desk and are stacked on top of the letters already in the stack. The first of the three is placed on the stack first, the second letter next, and the third letter on top.
- Step 2 – The top two letters in the stack are removed.

This process repeats until 36 letters have arrived (and the top two letters have been immediately removed). Once all 36 letters have arrived (and the top two letters have been immediately removed), no more letters arrive and the top two letters in the stack continue to be removed every five minutes until all 36 letters have been removed. At what time was the 13th letter to arrive removed?

(A) 1:15 **(B)** 1:20 **(C)** 1:10 **(D)** 1:05 **(E)** 1:25