**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 14, 2008

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Time: 1 hour © 2008 Waterloo Mathematics Foundation

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.

Please see our Web site: http://www.cemc.uwaterloo.ca. The Gauss Report will list the names of some top-scoring students. You will also be able to find copies of past Contests and 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 $6 \times 2 - 3$ is

   (A) 9 **(B)** -6 **(C)** 12 **(D)** 15 **(E)** 10

2. The value of $1 + 0.01 + 0.0001$ is

   (A) 1.0011 **(B)** 1.0110 **(C)** 1.1001 **(D)** 1.1010 **(E)** 1.0101

3. $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$ is equal to

   (A) 1 **(B)** $\frac{1}{64}$ **(C)** $\frac{3}{14}$ **(D)** $\frac{7}{8}$ **(E)** $\frac{3}{8}$

4. A regular polygon has perimeter 108 cm and each side has length 12 cm. How many sides does this polygon have?

   (A) 6 **(B)** 7 **(C)** 8 **(D)** 9 **(E)** 10

5. The smallest number in the set $\{$ 3.2, 2.3, 3, 2.23, 3.22 $\}$ is

   (A) 3.2 **(B)** 2.3 **(C)** 3 **(D)** 2.23 **(E)** 3.22

6. If PQ is a straight line, then the value of x is

   (A) 36 **(B)** 72 **(C)** 18

   (D) 20 **(E)** 45
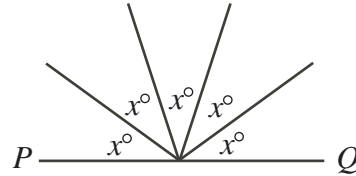
7. Which of the following is a prime number?

   (A) 20 **(B)** 21 **(C)** 23 **(D)** 25 **(E)** 27

8. Kayla went for a walk every day last week. Each day, she walked half as far as she did the day before. If she walked 8 kilometres on Monday last week, how many kilometres did she walk on Friday last week?

   (A) 0.25 **(B)** 4 **(C)** 1 **(D)** 2 **(E)** 0.5

9. The circle graph shows the favourite ice cream flavours of those surveyed. What fraction of people surveyed selected either chocolate or strawberry as their favourite flavour of ice cream?

   (A) $\frac{3}{5}$ **(B)** $\frac{1}{3}$ **(C)** $\frac{2}{3}$

   (D) $\frac{3}{4}$ **(E)** $\frac{5}{8}$
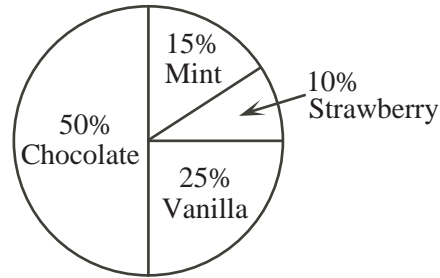
10. Max sold glasses of lemonade for 25 cents each. He sold 41 glasses on Saturday and 53 glasses on Sunday. What were his total sales for these two days?

   (A) $23.50 **(B)** $10.25 **(C)** $13.25 **(D)** $21.50 **(E)** $24.25

Part B: Each correct answer is worth 6.

11. Chris bought two hockey sticks at the same price. He also bought a helmet for $25. If Chris spent $68 in total, how much did one hockey stick cost?

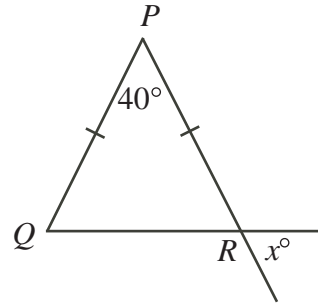   **(A)** $9.00 **(B)** $18.00 **(C)** $21.50 **(D)** $43.00 **(E)** $41.50

12. In the chart, each number below the top row is the positive difference of the two numbers to the right and left in the row immediately above it. What is the value of x?

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

    $$
    \begin{array}{ccccc}
    8 & 9 & 17 & 6 & 4 \\
    1 & 8 & - & 2 & \\
    7 & - & - & & \\
    - & x & - & & \\
    \end{array}
    $$

13. In the diagram, $\triangle PQR$ is isosceles. The value of x is

    (A) 40 **(B)** 70 **(C)** 60
    (D) 30 **(E)** 110

14. Wesley is 15 and his sister Breenah is 7. The sum of their ages is 22. In how many years will the sum of their ages be double what it is now?
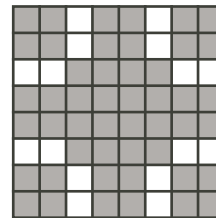
    (A) 7 **(B)** 8 **(C)** 15 **(D)** 14 **(E)** 11

15. Using two transformations, the letter R is changed as shown: R → Я → Я.
    Using the same two transformations, the letter L is changed as shown: L → ⅃ → Γ.
    Using the same two transformations, the letter G is changed to

    (A) G **(B)** ∂ **(C)** ⅁ **(D)** Ꮯ **(E)** ℧

16. In the diagram, each small square in the grid is the same size. What percent of the grid is shaded?

    (A) 84 **(B)** 80 **(C)** 90
    (D) 75 **(E)** 66

17. The length of a rectangle is 6 more than twice its width. If the perimeter of the rectangle is 120, what is its width?

    (A) 8 **(B)** 18 **(C)** 27 **(D)** 38 **(E)** 22

18. Rishi got the following marks on four math tests: 71, 77, 80, and 87. He will write one more math test. Each test is worth the same amount and all marks are between 0 and 100. Which of the following is a possible average for his five math tests?

    (A) 88 **(B)** 62 **(C)** 82 **(D)** 84 **(E)** 86

19. A 4×4 square grid can be entirely covered by three non-overlapping pieces made from 1×1 squares. If the first two pieces are ⊞ and ⊞ , the third piece is

    (A)   (B)   (C)   (D)   (E)
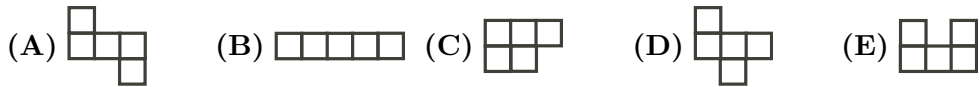
20. The product of three *different* positive integers is 72. What is the smallest possible sum of these integers?

    (A) 13   (B) 14   (C) 15   (D) 17   (E) 12

**Part C: Each correct answer is worth 8.**

21. Andrea has finished the third day of a six day canoe trip. If she has completed $\frac{3}{7}$ of the trip's total distance of 168 km, how many km per day must she average for the remainder of her trip?

    (A) 29   (B) 24   (C) 27   (D) 32   (E) 26

22. In the diagram, $PQRS$ is a trapezoid with an area of 12. RS is twice the length of PQ. The area of $\triangle PQS$ is

    (A) 3   (B) 4   (C) 5

    (D) 6   (E) 8
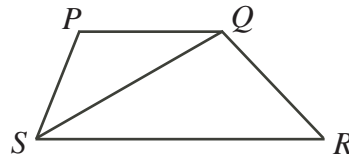
23. There are 24 ways in which Beverly, Dianne, Ethan, and Jamaal can arrange themselves to sit in a row of four seats. In how many ways can Beverly, Dianne, Ethan, and Jamaal arrange themselves in a row of four seats so that Ethan *does not* sit beside Dianne?

    (A) 18   (B) 12   (C) 21   (D) 6   (E) 15

24. A star is made by overlapping two identical equilateral triangles, as shown. The entire star has an area of 36. What is the area of the shaded region?

    (A) 24   (B) 18   (C) 27

    (D) 33   (E) 30
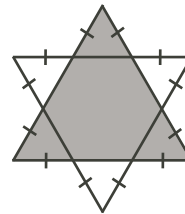
25. The sum of all the digits of the integers from 98 to 101 is

    $$9 + 8 + 9 + 9 + 1 + 0 + 0 + 1 + 0 + 1 = 38$$

    The sum of all of the digits of the integers from 1 to 2008 is

    (A) 30 054   (B) 27 018   (C) 28 036   (D) 30 036   (E) 28 054