



# Canadian Mathematics Competition

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

## *Gauss Contest (Grade 8)*

(Grade 7 Contest is on the reverse side)

Wednesday, May 12, 2004

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**Time:** 1 hour

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**Calculators are permitted.**

### Instructions

1. Do not open the examination booklet until you are told to do so.
2. You may use rulers, compasses and paper for rough work.
3. Be certain 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 decided on your choice, enter the appropriate letter on your answer sheet for that question.
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 tells you to start, you will have *sixty* minutes of working time.

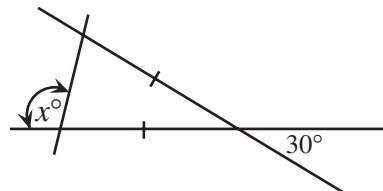
## Grade 8

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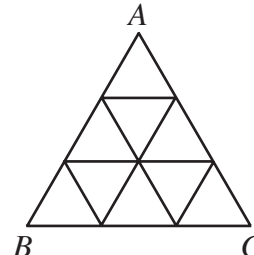
### Part A: Each correct answer is worth 5.

1. What is the value of 25% of 2004?  
(A) 1002      (B) 501      (C) 50 100      (D) 2505      (E) 1503
2. The value of  $\frac{1}{2} + \frac{3}{4} - \frac{5}{8}$  is  
(A)  $\frac{9}{14}$       (B) 0      (C)  $\frac{5}{8}$       (D)  $\frac{1}{4}$       (E)  $\frac{7}{8}$
3. If  $800\,670 = 8 \times 10^x + 6 \times 10^y + 7 \times 10^z$ , where  $x, y$  and  $z$  are whole numbers, then  $x + y + z$  equals  
(A) 11      (B) 8      (C) 6      (D) 3      (E) 5
4.  $\frac{7863}{13} = 604 + \frac{\square}{13}$ . The number represented by  $\square$  is  
(A) 11      (B) 8      (C) 9      (D) 3      (E) 10

5. In the diagram, the value of  $x$  is  
(A) 30      (B) 75      (C) 100  
(D) 105      (E) 150



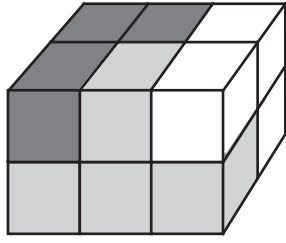
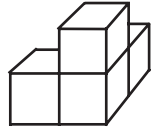
6.  $\triangle ABC$  is constructed from nine small, equilateral triangles, as shown. If the perimeter of each of the nine small triangles is 6 cm, then the perimeter of  $\triangle ABC$ , in cm, is  
(A) 18      (B) 24      (C) 27  
(D) 36      (E) 54

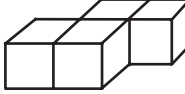


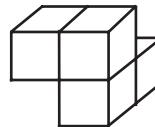
7. If  $x = -4$  and  $y = 4$ , which of the following expressions gives the largest answer?  
(A)  $\frac{x}{y}$       (B)  $y - 1$       (C)  $x - 1$       (D)  $-xy$       (E)  $x + y$
8. Two fair coins are tossed at the same time. What is the probability they will both land as “HEADS”?  
(A) 0      (B) 1      (C)  $\frac{1}{2}$       (D)  $\frac{1}{3}$       (E)  $\frac{1}{4}$
9. The water surface of Lake Superior is at an elevation of 180 m *above* sea level. The lowest point of the lake floor is 220 m *below* sea level. What is the actual depth of the lake at this point?  
(A) 40 m      (B) 300 m      (C) 380 m      (D) 400 m      (E) 500 m
10. Two positive integers have a sum of 11. The greatest possible product of these two positive integers is  
(A) 11      (B) 18      (C) 28      (D) 35      (E) 30

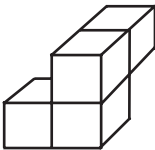
## Grade 8

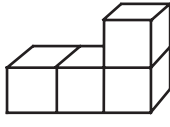
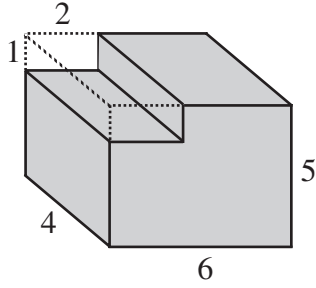
### Part B: Each correct answer is worth 6.

11. Ruth walks at a constant speed of 5 km/h. How many minutes will it take her to walk 1.5 km?  
 (A) 20                      (B) 24                      (C) 18                      (D) 15                      (E) 7.5
12. When the numbers  $\sqrt{36}$ , 35.2, 35.19, and  $5^2$  are arranged from smallest to largest, the correct ordering is  
 (A)  $5^2$ , 35.19, 35.2,  $\sqrt{36}$   
 (B) 35.19, 35.2,  $5^2$ ,  $\sqrt{36}$   
 (C)  $5^2$ ,  $\sqrt{36}$ , 35.19, 35.2  
 (D)  $\sqrt{36}$ ,  $5^2$ , 35.19, 35.2  
 (E)  $\sqrt{36}$ ,  $5^2$ , 35.2, 35.19
13. There are 13 trees on one side of the street on Trina's way from her house to school. Today, on her way to school, Trina put a chalk mark on every other tree, starting with the first she passed. When she goes home from school, she will put a chalk mark on every third tree, again starting with the first one she passes. By the time Trina arrives at home, how many of the 13 trees will *not* have a chalk mark on them?  
 (A) 6                      (B) 4                      (C) 8                      (D) 2                      (E) 7
14. A rectangular wooden prism is made up of three pieces, each consisting of four cubes of wood glued together. Which of the pieces below has the same shape as the black piece?
- 
- (A) 

(B) 

(C) 

(D) 

(E) 
15. In the diagram, the volume of the shaded solid is  
 (A) 8                      (B) 112                      (C) 113  
 (D) 120                      (E) 128
- 
16. A two-digit number is divisible by 8, 12 and 18. The number is between  
 (A) 10 and 19                      (B) 20 and 39                      (C) 40 and 59                      (D) 60 and 79                      (E) 80 and 99
17. If  $2^a = 8$  and  $a = 3c$ , then  $c$  equals  
 (A) 0                      (B)  $\frac{3}{4}$                       (C) 1                      (D)  $\frac{4}{3}$                       (E) 6
18. The scores of eight students on a quiz are 6, 7, 7, 8, 8, 8, 9, and 10. Which score should be removed to leave seven scores with the same mode and range as the original eight scores, but with a higher average (mean)?  
 (A) 6                      (B) 7                      (C) 8                      (D) 9                      (E) 10

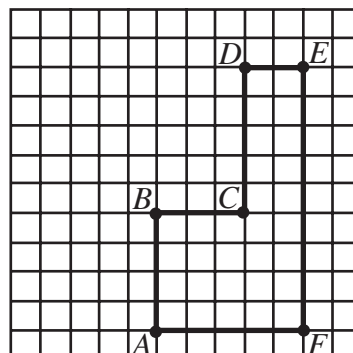
## Grade 8

19. Chloe has made a code out of the alphabet by assigning a numerical value to each letter. She then assigns a numerical value to a word by adding up the numerical values of the letters in the word. Using her code, the numerical value of BAT is 6. Also, her code gives numerical values of 8 to CAT and 12 to CAR. Using her code, what is the numerical value of BAR?

(A) 10                      (B) 14                      (C) 18                      (D) 12                      (E) 20

20. In the diagram, which of the following is the largest?

(A)  $AE$                       (B)  $CD + CF$                       (C)  $AC + CF$   
 (D)  $FD$                       (E)  $AC + CE$



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

21. On Tony's map, the distance from Saint John, NB to St. John's, NL is 21 cm. The actual distance between these two cities is 1050 km. What is the scale of Tony's map?

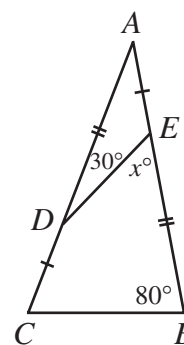
(A) 1:50 000                      (B) 1:200 000                      (C) 1:500 000                      (D) 1:2 000 000                      (E) 1:5 000 000

22. Water is poured from a full 1.5 L bottle into an empty glass until both the glass and the bottle are  $\frac{3}{4}$  full. What is the volume of the glass?

(A) 0.5 L                      (B) 0.75 L                      (C) 1.125 L                      (D) 0.6 L                      (E) 0.4 L

23. In the diagram, the value of  $x$  is

(A) 40                      (B) 45                      (C) 50  
 (D) 55                      (E) 60



24. Let  $x$  be the three-digit number with digits  $ABC$  and  $y$  be the three-digit number with digits  $CBA$ . The digits  $A$  and  $C$  are not 0. If  $x - y = 495$ , how many possibilities are there for  $x$ ?

(A) 50                      (B) 40                      (C) 24                      (D) 36                      (E) 32

25. A large block, which has dimensions  $n$  by 11 by 10, is made up of a number of unit cubes and one 2 by 1 by 1 block. There are exactly 2362 positions in which the 2 by 1 by 1 block can be placed. What is the value of  $n$ ?

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

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### PUBLICATIONS

Please see our website <http://www.cemc.uwaterloo.ca> for information on publications which are excellent resources for enrichment, problem solving and contest preparation.