



Canadian Mathematics Competition

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

Gauss Contest (Grade 7)

(Grade 8 Contest is on the reverse side)

Wednesday, May 16, 2001

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Time: 1 hour

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Calculators are permitted.

Instructions

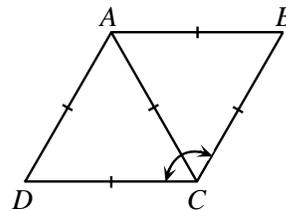
1. Do not open the examination booklet until you are told to do so.
2. You may use rulers, compasses and paper for rough work.
3. Be certain that you understand the coding system for your answer sheet. If you are not sure, ask your teacher to explain it.
4. This is a multiple-choice test. Each question 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 20.
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 7

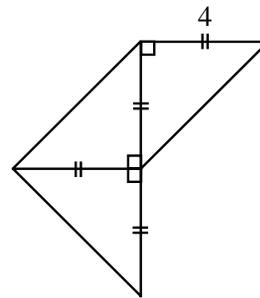
Scoring: There is *no penalty* for an incorrect answer.
Each unanswered question is worth 2, to a maximum of 20.

Part A: Each correct answer is worth 5.

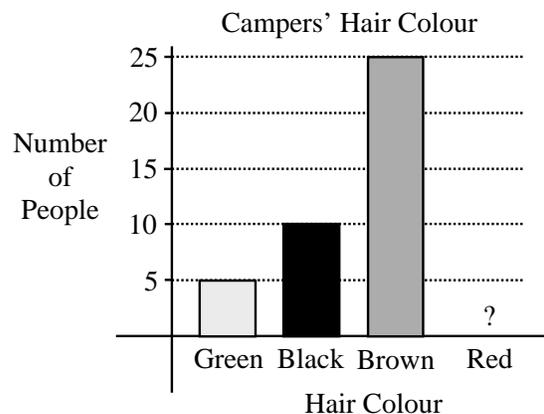
1. The largest number in the set $\{0.01, 0.2, 0.03, 0.02, 0.1\}$ is
(A) 0.01 (B) 0.2 (C) 0.03 (D) 0.02 (E) 0.1
2. In 1998, the population of Canada was 30.3 million. Which number is the same as 30.3 million?
(A) 30 300 000 (B) 303 000 000 (C) 30 300 (D) 303 000 (E) 30 300 000 000
3. The value of $0.001 + 1.01 + 0.11$ is
(A) 1.111 (B) 1.101 (C) 1.013 (D) 0.113 (E) 1.121
4. When the number 16 is doubled and the answer is then halved, the result is
(A) 2^1 (B) 2^2 (C) 2^3 (D) 2^4 (E) 2^8
5. The value of $3 \times 4^2 - (8 \div 2)$ is
(A) 44 (B) 12 (C) 20 (D) 8 (E) 140
6. In the diagram, $ABCD$ is a rhombus. The size of $\angle BCD$ is
(A) 60° (B) 90° (C) 120°
(D) 45° (E) 160°



7. A number line has 40 consecutive integers marked on it. If the smallest of these integers is -11 , what is the largest?
(A) 29 (B) 30 (C) 28 (D) 51 (E) 50
8. The area of the entire figure shown is
(A) 16 (B) 32 (C) 20
(D) 24 (E) 64



9. The bar graph shows the hair colours of the campers at Camp Gauss. The bar corresponding to redheads has been accidentally removed. If 50% of the campers have brown hair, how many of the campers have red hair?
(A) 5 (B) 10 (C) 25
(D) 50 (E) 60



Grade 7

10. Henri scored a total of 20 points in his basketball team's first three games. He scored $\frac{1}{2}$ of these points in the first game and $\frac{1}{10}$ of these points in the second game. How many points did he score in the third game?
- (A) 2 (B) 10 (C) 11 (D) 12 (E) 8

Part B: Each correct answer is worth 6.

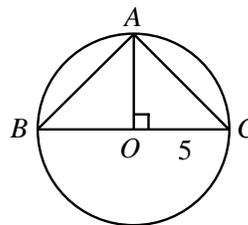
11. A fair die is constructed by labelling the faces of a wooden cube with the numbers 1, 1, 1, 2, 3, and 3. If this die is rolled once, the probability of rolling an odd number is
- (A) $\frac{5}{6}$ (B) $\frac{4}{6}$ (C) $\frac{3}{6}$ (D) $\frac{2}{6}$ (E) $\frac{1}{6}$
12. The ratio of the number of big dogs to the number of small dogs at a pet show is 3:17. There are 80 dogs, in total, at this pet show. How many big dogs are there?
- (A) 12 (B) 68 (C) 20 (D) 24 (E) 6
13. The product of two whole numbers is 24. The smallest possible sum of these two numbers is
- (A) 9 (B) 10 (C) 11 (D) 14 (E) 25

14. In the square shown, the numbers in each row, column, and diagonal multiply to give the same result. The sum of the two missing numbers is
- (A) 28 (B) 15 (C) 30
(D) 38 (E) 72

12	1	18
9	6	4
		3

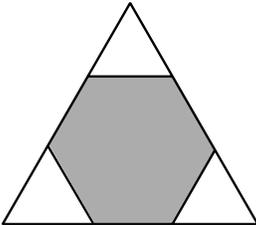
15. A prime number is called a "Superprime" if doubling it, and then subtracting 1, results in another prime number. The number of Superprimes less than 15 is
- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

16. BC is a diameter of the circle with centre O and radius 5, as shown. If A lies on the circle and AO is perpendicular to BC , the area of triangle ABC is
- (A) 6.25 (B) 12.5 (C) 25
(D) 37.5 (E) 50



17. A rectangular sign that has dimensions 9 m by 16 m has a square advertisement painted on it. The border around the square is required to be at least 1.5 m wide. The area of the largest square advertisement that can be painted on the sign is
- (A) 78 m^2 (B) 144 m^2 (C) 36 m^2 (D) 9 m^2 (E) 56.25 m^2
18. Felix converted \$924.00 to francs before his trip to France. At that time, each franc was worth thirty cents. If he returned from his trip with 21 francs, how many francs did he spend?
- (A) 3080 (B) 3101 (C) 256.2 (D) 3059 (E) 298.2
19. Rectangular tiles, which measure 6 by 4, are arranged without overlapping, to create a square. The minimum number of these tiles needed to make a square is
- (A) 8 (B) 24 (C) 4 (D) 12 (E) 6
20. Anne, Beth and Chris have 10 candies to divide amongst themselves. Anne gets at least 3 candies, while Beth and Chris each get at least 2. If Chris gets at most 3, the number of candies that Beth could get is
- (A) 2 (B) 2 or 3 (C) 3 or 4 (D) 2, 3 or 5 (E) 2, 3, 4, or 5

Part C: Each correct answer is worth 8.

21. Naoki wrote nine tests, each out of 100. His average on these nine tests is 68%. If his lowest mark is omitted, what is his highest possible resulting average?
 (A) 76.5% (B) 70% (C) 60.4% (D) 77% (E) 76%
22. A regular hexagon is inscribed in an equilateral triangle, as shown. If the hexagon has an area of 12, the area of this triangle is
 (A) 20 (B) 16 (C) 15
 (D) 18 (E) 24
- 
23. Catrina runs 100 m in 10 seconds. Sedra runs 400 m in 44 seconds. Maintaining these constant speeds, they participate in a 1 km race. How far ahead, to the nearest metre, is the winner as she crosses the finish line?
 (A) 100 m (B) 110 m (C) 95 m (D) 90 m (E) 91 m
24. Enzo has fish in two aquariums. In one aquarium, the ratio of the number of guppies to the number of goldfish is 2:3. In the other, this ratio is 3:5. If Enzo has 20 guppies in total, the least number of goldfish that he could have is
 (A) 29 (B) 30 (C) 31 (D) 32 (E) 33
25. A triangle can be formed having side lengths 4, 5 and 8. It is impossible, however, to construct a triangle with side lengths 4, 5 and 9. Ron has eight sticks, each having an integer length. He observes that he cannot form a triangle using any three of these sticks as side lengths. The shortest possible length of the longest of the eight sticks is
 (A) 20 (B) 21 (C) 22 (D) 23 (E) 24



PUBLICATIONS

Students and parents who enjoy solving problems for fun and recreation may find the following publications of interest. They are an excellent resource for enrichment, problem solving, and contest preparation.

COPIES OF PREVIOUS CONTESTS (WITH FULL SOLUTIONS)

Copies of previous contests, together with solutions, are available as described below. Each item in the package has two numbers. Numbers prefixed with E are English language supplies - numbers prefixed with F are French language supplies. Each package is considered as one title. Included is one copy of any one contest, together with solutions, for each of the past three years. Recommended for individuals.

Gauss Contests (Grades 7,8) E 213, F 213 \$10.00 **Pascal/Cayley/Fermat Contests** (Grades 9,10,11) E 513, F 513 \$14.00
Euclid Contests (Grade 12) E 613, F 613 \$10.00 **Descartes Contests** (Grade 13/OAC) E 713, F 713 \$10.00

PROBLEMS PROBLEMS PROBLEMS BOOKS

Each volume is a collection of problems (multiple choice and full solution), grouped into 9 or more topics. Questions are selected from previous Canadian Mathematics Competition contests, and full solutions are provided for all questions. The price is \$15.00 per volume.

Available in English only. Problems Problems Problems - Volume 1 only is currently available in French.

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Volume 3 - 235 problems (Senior high school students) **Volume 4** - 325 problems (Grades 7, 8, and 9)
Volume 5 - 200 problems (Senior high school students) **Volume 6** - 300 problems (Grades 7, 8, and 9)

PROBLEMS AND HOW TO SOLVE THEM - VOLUME 3

This new book continues the collection of problems available for enrichment of students in grades 7 and 8. Included for each of the eight chapters is a discussion on solving problems, with suggested approaches. There are more than 179 new problems, almost all from Canadian Mathematics Competitions, with complete solutions. **The price is \$20. (Available in English only.)**

Orders should be addressed to: Canadian Mathematics Competition, Faculty of Mathematics, University of Waterloo, Waterloo, Ontario, N2L 3G1. Cheques or money orders in Canadian funds should be made payable to "Centre for Education in Mathematics and Computing". In Canada, add \$3.00 for the first item ordered for shipping and handling, plus \$1.00 for each subsequent item. No Provincial Sales Tax is required, but 7% GST must be added, and 15% HST must be added in New Brunswick, Newfoundland and Nova Scotia. Orders *outside of Canada ONLY*, add \$10.00 for the first item ordered for shipping and handling, plus \$2.00 for each subsequent item. **Prices for these publications will remain in effect until September 1, 2001.**

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