



The CENTRE for EDUCATION
in MATHEMATICS and COMPUTING
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Gauss Contest

(Grade 7)

(The Grade 8 Contest is on the reverse side)

Wednesday, May 11, 2011

UNIVERSITY OF
WATERLOO

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MATHEMATICS

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Time: 1 hour

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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.

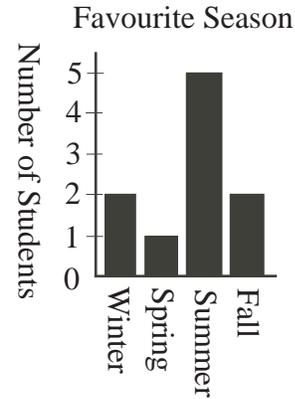
Grade 7

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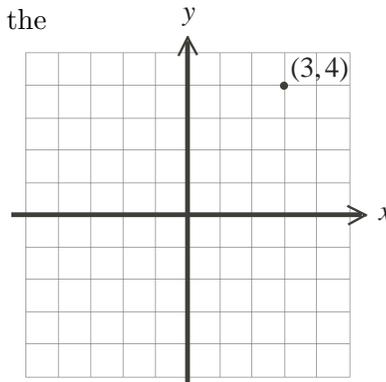
Each unanswered question is worth 2, to a maximum of 10 unanswered questions.

Part A: Each correct answer is worth 5.

1. The value of $5 + 4 - 3 + 2 - 1$ is
 (A) 0 (B) -5 (C) 3 (D) -3 (E) 7
2. The value of $\sqrt{9 + 16}$ is
 (A) 5.2 (B) 7 (C) 5.7 (D) 25 (E) 5
3. Students were surveyed about their favourite season. The results are shown in the bar graph. What percentage of the 10 students surveyed chose Spring?
 (A) 50 (B) 10 (C) 25
 (D) 250 (E) 5



4. Ground beef sells for \$5.00 per kg. How much does 12 kg of ground beef cost?
 (A) \$5.00 (B) \$12.00 (C) \$60.00 (D) \$17.00 (E) \$2.40
5. The smallest number in the list {1.0101, 1.0011, 1.0110, 1.1001, 1.1100} is
 (A) 1.0101 (B) 1.0011 (C) 1.0110 (D) 1.1001 (E) 1.1100
6. You are writing a multiple choice test and on one question you guess and pick an answer at random. If there are five possible choices (A,B,C,D,E), what is the probability that you guessed correctly?
 (A) $\frac{1}{5}$ (B) $\frac{5}{5}$ (C) $\frac{4}{5}$ (D) $\frac{2}{5}$ (E) $\frac{3}{5}$
7. $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$ equals
 (A) $3\frac{1}{3}$ (B) $7 + \frac{1}{3}$ (C) $\frac{3}{7}$ (D) $7 + 3$ (E) $7 \times \frac{1}{3}$
8. Keegan paddled the first 12 km of his 36 km kayak trip before lunch. What fraction of his overall trip remains to be completed after lunch?
 (A) $\frac{1}{2}$ (B) $\frac{5}{6}$ (C) $\frac{3}{4}$ (D) $\frac{2}{3}$ (E) $\frac{3}{5}$
9. If the point (3, 4) is reflected in the x -axis, what are the coordinates of its image?
 (A) (-4, 3) (B) (-3, 4) (C) (4, 3)
 (D) (3, -4) (E) (-3, -4)

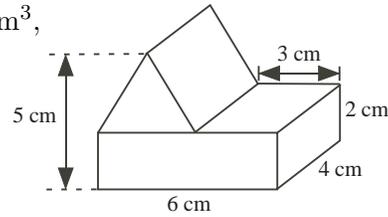


19. The sum of four numbers is T . Suppose that each of the four numbers is now increased by 1. These four new numbers are added together and then the sum is tripled. What is the value of this final result?

(A) $3T + 3$ (B) $3T + 4$ (C) $3T + 12$ (D) $T + 12$ (E) $12T$

20. A triangular prism is placed on a rectangular prism, as shown. The volume of the combined structure, in cm^3 , is

(A) 76 (B) 78 (C) 72
(D) 84 (E) 66



Part C: Each correct answer is worth 8.

21. Steve begins at 7 and counts forward by 3, obtaining the list 7, 10, 13, and so on. Dave begins at 2011 and counts backwards by 5, obtaining the list 2011, 2006, 2001, and so on. Which of the following numbers appear in each of their lists?

(A) 1009 (B) 1006 (C) 1003 (D) 1001 (E) 1011

22. A pool has a volume of 4000 L. Sheila starts filling the empty pool with water at a rate of 20 L/min. The pool springs a leak after 20 minutes and water leaks out at 2 L/min. Beginning from the time when Sheila starts filling the empty pool, how long does it take until the pool is completely full?

(A) 3 hours (B) 3 hours 40 minutes (C) 4 hours
(D) 4 hours 20 minutes (E) 3 hours 20 minutes

23. In the addition of the three-digit numbers shown, the letters A , B , C , D , and E each represent a single digit.

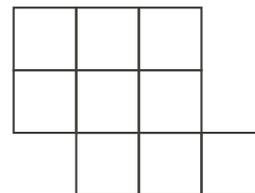
$$\begin{array}{r} A \ B \ E \\ A \ C \ E \\ + A \ D \ E \\ \hline 2 \ 0 \ 1 \ 1 \end{array}$$

The value of $A + B + C + D + E$ is

(A) 34 (B) 21 (C) 32 (D) 27 (E) 24

24. From the figure shown, three of the nine squares are to be selected. Each of the three selected squares must share a side with at least one of the other two selected squares. In how many ways can this be done?

(A) 19 (B) 22 (C) 15
(D) 16 (E) 20



25. Ten circles are all the same size. Each pair of these circles overlap but no circle is exactly on top of another circle. What is the greatest possible total number of intersection points of these ten circles?

(A) 40 (B) 70 (C) 80 (D) 90 (E) 110