



Anniversary
1963 – 1998

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 13, 1998

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Time: 1 hour

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Calculators are permitted.

Instructions

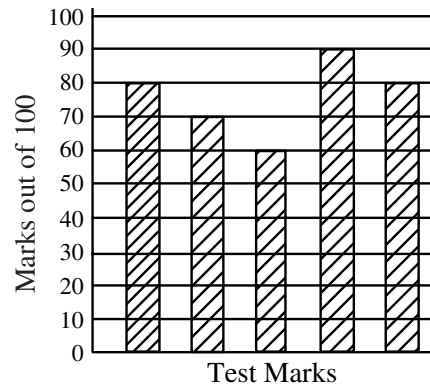
1. Do not open the examination booklet until you are told to do so.
2. You may use rulers, compasses and paper for rough work.
3. Be certain that you understand the coding system for your answer sheet. If you are not sure, ask your teacher to explain it.
4. This is a multiple-choice test. Each question 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 credits in Part A, 6 credits in Part B, and 8 credits in Part C.
There is *no penalty* for an incorrect answer.
Each unanswered question is worth 2 credits, to a maximum of 20 credits.
6. Diagrams are *not* drawn to scale. They are intended as aids only.
7. When your supervisor instructs you to begin, 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 credits, to a maximum of 20 credits.

Part A (5 credits each)

1. The value of $\frac{1998 - 998}{1000}$ is
 (A) 1 (B) 1000 (C) 0.1 (D) 10 (E) 0.001
2. The number 4567 is tripled. The ones digit (units digit) in the resulting number is
 (A) 5 (B) 6 (C) 7 (D) 3 (E) 1
3. If $S = 6 \times 10\,000 + 5 \times 1000 + 4 \times 10 + 3 \times 1$, what is S ?
 (A) 6543 (B) 65 043 (C) 65 431 (D) 65 403 (E) 60 541
4. Jean writes five tests and achieves the marks shown on the graph. What is her average mark on these five tests?
 (A) 74 (B) 76 (C) 70
 (D) 64 (E) 79

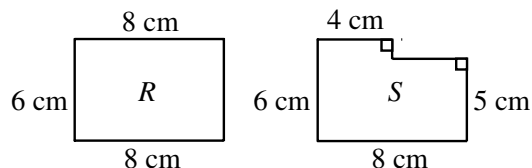


5. If a machine produces 150 items in one minute, how many would it produce in 10 seconds?
 (A) 10 (B) 15 (C) 20 (D) 25 (E) 30
 6. In the multiplication question, the sum of the digits in the four boxes is
 (A) 13 (B) 12 (C) 27
 (D) 9 (E) 22
- $$\begin{array}{r}
 879 \\
 \times 492 \\
 \hline
 \square 758 \\
 7\square 11 \\
 35\square 6 \\
 \hline
 43\square 468
 \end{array}$$
7. A rectangular field is 80 m long and 60 m wide. If fence posts are placed at the corners and are 10 m apart along the 4 sides of the field, how many posts are needed to completely fence the field?
 (A) 24 (B) 26 (C) 28 (D) 30 (E) 32
 8. Tuesday's high temperature was 4°C warmer than that of Monday's. Wednesday's high temperature was 6°C cooler than that of Monday's. If Tuesday's high temperature was 22°C , what was Wednesday's high temperature?
 (A) 20°C (B) 24°C (C) 12°C (D) 32°C (E) 16°C
 9. Two numbers have a sum of 32. If one of the numbers is -36 , what is the other number?
 (A) 68 (B) -4 (C) 4 (D) 72 (E) -68
 10. At the waterpark, Bonnie and Wendy decided to race each other down a waterslide. Wendy won by 0.25 seconds. If Bonnie's time was exactly 7.80 seconds, how long did it take for Wendy to go down the slide?
 (A) 7.80 seconds (B) 8.05 seconds (C) 7.55 seconds (D) 7.15 seconds (E) 7.50 seconds

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Part B (6 credits each)

11. Kalyn cut rectangle R from a sheet of paper. A smaller rectangle is then cut from the large rectangle R to produce figure S . In comparing R to S



- (A) the area and perimeter both decrease
 (B) the area decreases and the perimeter increases
 (C) the area and perimeter both increase
 (D) the area increases and the perimeter decreases
 (E) the area decreases and the perimeter stays the same
12. Steve plants ten trees every three minutes. If he continues planting at the same rate, how long will it take him to plant 2500 trees?

- (A) $1\frac{1}{4}$ h (B) 3 h (C) 5 h (D) 10 h (E) $12\frac{1}{2}$ h

13. The pattern of figures $\triangle \bullet \square \blacktriangle \circ$ is repeated in the sequence



The 214th figure in the sequence is

- (A) \triangle (B) \bullet (C) \square (D) \blacktriangle (E) \circ
14. A cube has a volume of 125 cm^3 . What is the area of one face of the cube?

- (A) 20 cm^2 (B) 25 cm^2 (C) $41\frac{2}{3} \text{ cm}^2$ (D) 5 cm^2 (E) 75 cm^2

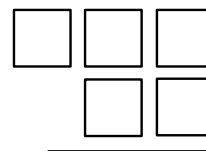
15. The diagram shows a magic square in which the sums of the numbers in any row, column or diagonal are equal. What is the value of n ?

- (A) 3 (B) 6 (C) 7
 (D) 10 (E) 11

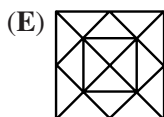
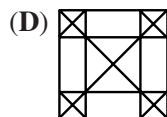
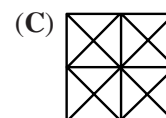
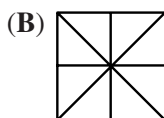
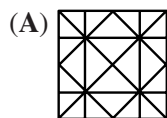
8		
9		5
4	n	

16. Each of the digits 3, 5, 6, 7, and 8 is placed one to a box in the diagram. If the two digit number is subtracted from the three digit number, what is the smallest difference?

- (A) 269 (B) 278 (C) 484
 (D) 271 (E) 261



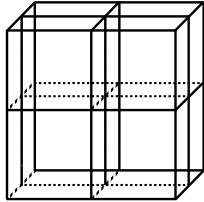
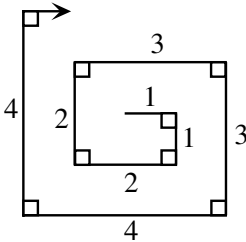
17. Claire takes a square piece of paper and folds it in half four times without unfolding, making an isosceles right triangle each time. After unfolding the paper to form a square again, the creases on the paper would look like



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18. The letters of the word 'GAUSS' and the digits in the number '1998' are each cycled separately and then numbered as shown.
1. AUSSG 9981
 2. USSGA 9819
 3. SSGAU 8199
- etc.
- If the pattern continues in this way, what number will appear in front of GAUSS 1998?
- (A) 4 (B) 5 (C) 9 (D) 16 (E) 20
19. Juan and Mary play a two-person game in which the winner gains 2 points and the loser loses 1 point. If Juan won exactly 3 games and Mary had a final score of 5 points, how many games did they play?
- (A) 7 (B) 8 (C) 4 (D) 5 (E) 11
20. Each of the 12 edges of a cube is coloured either red or green. Every face of the cube has at least one red edge. What is the smallest number of red edges?
- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6
-

Part C (8 credits each)

21. Ten points are spaced equally around a circle. How many different chords can be formed by joining any 2 of these points? (A chord is a straight line joining two points on the circumference of a circle.)
- (A) 9 (B) 45 (C) 17 (D) 66 (E) 55
22. Each time a bar of soap is used, its volume decreases by 10%. What is the minimum number of times a new bar would have to be used so that less than one-half its volume remains?
- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9
23. A cube measures $10\text{ cm} \times 10\text{ cm} \times 10\text{ cm}$. Three cuts are made parallel to the faces of the cube as shown creating eight separate solids which are then separated. What is the increase in the total surface area?
- (A) 300 cm^2 (B) 800 cm^2 (C) 1200 cm^2
(D) 600 cm^2 (E) 0 cm^2
- 
24. On a large piece of paper, Dana creates a "rectangular spiral" by drawing line segments of lengths, in cm, of 1, 1, 2, 2, 3, 3, 4, 4, ... as shown. Dana's pen runs out of ink after the total of all the lengths he has drawn is 3000 cm. What is the length of the longest line segment that Dana draws?
- (A) 38 (B) 39 (C) 54
(D) 55 (E) 30
- 
25. Two natural numbers, p and q , do not end in zero. The product of any pair, p and q , is a power of 10 (that is, 10, 100, 1000, 10 000, ...). If $p > q$, the last digit of $p - q$ cannot be
- (A) 1 (B) 3 (C) 5 (D) 7 (E) 9