



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 17, 2000

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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 8

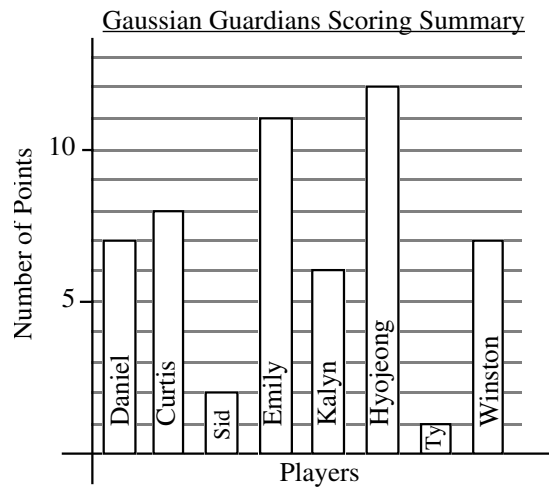
Scoring: There is *no penalty* for an incorrect answer.
Each unanswered question is worth 2 credits, to a maximum of 20 credits.

Part A (5 credits each)

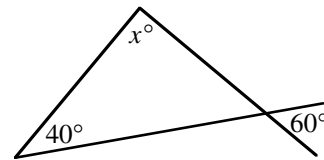
- The value of $2^5 + 5$ is
(A) 20 (B) 37 (C) 11 (D) 13 (E) 21
- A number is placed in the box to make the following statement true: $8 + \frac{7}{\square} + \frac{3}{1000} = 8.073$. What is this number?
(A) 1000 (B) 100 (C) 1 (D) 10 (E) 70
- The value of $\frac{5+4-3}{5+4+3}$ is
(A) -1 (B) $\frac{1}{3}$ (C) 2 (D) $\frac{1}{2}$ (E) $-\frac{1}{2}$
- In the addition shown, a digit, either the same or different, can be placed in each of the two boxes. What is the sum of the two missing digits?
(A) 9 (B) 11 (C) 13
(D) 3 (E) 7

$$\begin{array}{r} 863 \\ \square 91 \\ 7\square 8 \\ \hline 2182 \end{array}$$

- The graph shows the complete scoring summary for the last game played by the eight players on Gaussian Guardians intramural basketball team. The total number of points scored by the Gaussian Guardians was
(A) 54 (B) 8 (C) 12
(D) 58 (E) 46



- In the given diagram, what is the value of x ?
(A) 20 (B) 80 (C) 100
(D) 120 (E) 60



- During the week, the Toronto Stock Exchange made the following gains and losses:

Monday	-150	Thursday	+182
Tuesday	+106	Friday	-210
Wednesday	-47		

What was the net change for the week?

- (A) a loss of 119 (B) a gain of 119 (C) a gain of 91
(D) a loss of 91 (E) a gain of 695
- If $x * y = x + y^2$, then $2 * 3$ equals
(A) 8 (B) 25 (C) 11 (D) 13 (E) 7

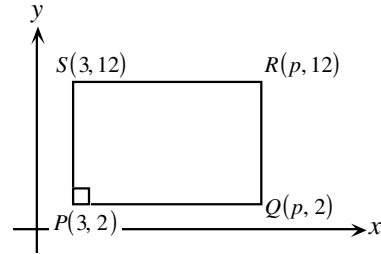
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9. Of the following five statements, how many are correct?
 (i) 20% of $40 = 8$ (ii) $2^3 = 8$ (iii) $7 - 3 \times 2 = 8$ (iv) $3^2 - 1^2 = 8$ (v) $2(6 - 4)^2 = 8$
 (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
10. Karl had his salary reduced by 10% . He was later promoted and his salary was increased by 10% . If his original salary was \$20 000, what is his present salary?
 (A) \$16 200 (B) \$19 800 (C) \$20 000 (D) \$20 500 (E) \$24 000

Part B (6 credits each)

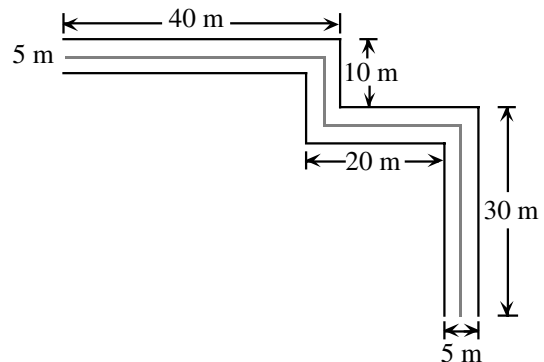
11. Pat planned to place patio stones in a rectangular garden that has dimensions 15 m by 2 m. If each patio stone measures 0.5 m by 0.5 m, how many stones are needed to cover the garden?
 (A) 240 (B) 180 (C) 120 (D) 60 (E) 30
12. The prime numbers between 10 and 20 are added together to form the number Q . What is the largest prime divisor of Q ?
 (A) 2 (B) 3 (C) 5 (D) 7 (E) 11

13. The coordinates of the vertices of rectangle $PQRS$ are given in the diagram. The area of rectangle $PQRS$ is 120. The value of p is
 (A) 10 (B) 12 (C) 13
 (D) 14 (E) 15



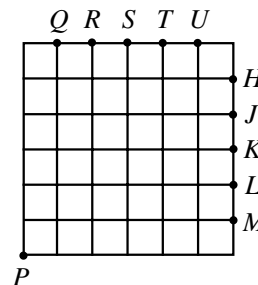
14. A set of five different positive integers has an average (arithmetic mean) of 11. What is the largest possible number in this set?
 (A) 45 (B) 40 (C) 35 (D) 44 (E) 46
15. $ABCD$ is a square that is made up of two identical rectangles and two squares of area 4 cm^2 and 16 cm^2 . What is the area, in cm^2 , of the square $ABCD$?
 (A) 64 (B) 49 (C) 25 (D) 36 (E) 20
16. Three tenths of our planet Earth is covered with land and the rest is covered with water. Ninety-seven percent of the water is salt water and the rest is fresh water. What percentage of the Earth is covered in fresh water?
 (A) 20.1% (B) 79.9% (C) 32.1% (D) 2.1% (E) 9.6%
17. In a certain month, three of the Sundays have dates that are even numbers. The tenth day of this month is a
 (A) Saturday (B) Sunday (C) Monday (D) Tuesday (E) Wednesday
18. Jim drives 60 km south, 40 km west, 20 km north, and 10 km east. What is the distance from his starting point to his finishing point?
 (A) 30 km (B) 50 km (C) 40 km (D) 70 km (E) 35 km

19. A paved pedestrian path is 5 metres wide. A yellow line is painted down the middle. If the edges of the path measure 40 m, 10 m, 20 m, and 30 m, as shown, what is the length of the yellow line?
 (A) 100 m (B) 97.5 m (C) 95 m
 (D) 92.5 m (E) 90 m



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20. In the 6 by 6 grid shown, two lines are drawn through point P , dividing the grid into three regions of equal area. These lines will pass through the points
 (A) M and Q (B) L and R (C) K and S
 (D) H and U (E) J and T



Part C (8 credits each)

21. Sam is walking in a straight line towards a lamp post which is 8 m high. When he is 12 m away from the lamp post, his shadow is 4 m in length. When he is 8 m from the lamp post, what is the length of his shadow?

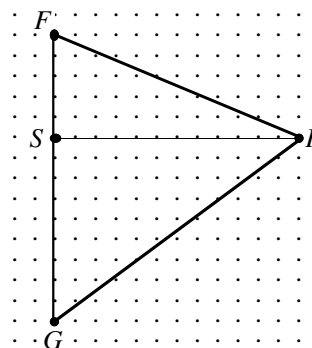
- (A) $1\frac{1}{2}$ m (B) 2 m (C) $2\frac{1}{2}$ m (D) $2\frac{2}{3}$ m (E) 3 m

22. The homes of Fred (F), Sandy (S), Robert (R), and Guy (G) are marked on the rectangular grid with straight lines joining them. Fred is considering four routes to visit each of his friends:

- (i) $F \rightarrow R \rightarrow S \rightarrow G$ (ii) $F \rightarrow S \rightarrow G \rightarrow R$
 (iii) $F \rightarrow R \rightarrow G \rightarrow S$ (iv) $F \rightarrow S \rightarrow R \rightarrow G$

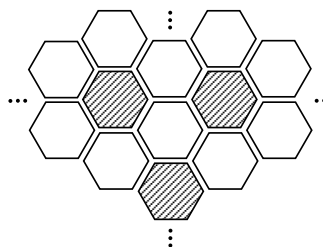
If $FS = 5$ km, $SG = 9$ km and $SR = 12$ km, the difference between the longest and the shortest trip (in km) is

- (A) 8 (B) 13 (C) 15
 (D) 2 (E) 0



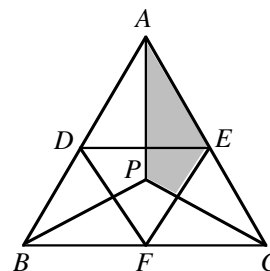
23. A square floor is tiled, as partially shown, with a large number of regular hexagonal tiles. The tiles are coloured blue or white. Each blue tile is surrounded by 6 white tiles and each white tile is surrounded by 3 white and 3 blue tiles. Ignoring part tiles, the ratio of the number of blue tiles to the number of white tiles is closest to

- (A) 1:6 (B) 2:3 (C) 3:10
 (D) 1:4 (E) 1:2



24. In equilateral triangle ABC , line segments are drawn from a point P to the vertices A , B and C to form three identical triangles. The points D , E and F are the midpoints of the three sides and they are joined as shown in the diagram. What fraction of $\triangle ABC$ is shaded?

- (A) $\frac{1}{5}$ (B) $\frac{5}{24}$ (C) $\frac{1}{4}$
 (D) $\frac{2}{9}$ (E) $\frac{2}{7}$



25. The cookies in a jar contain a total of 1000 chocolate chips. All but one of these cookies contains the same number of chips; it contains one more chip than the others. The number of cookies in the jar is between one dozen and three dozen. What is the sum of the number of cookies in the jar and the number of chips in the cookie with the extra chocolate chip?

- (A) 65 (B) 64 (C) 63 (D) 66 (E) 67