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 11, 2005

Time: 1 hour

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 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 instructs you to start, you will have *sixty* minutes of working time.

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

Scoring: There is *no penalty* for an incorrect answer.
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 $\dfrac{3 \times 4}{6}$ is

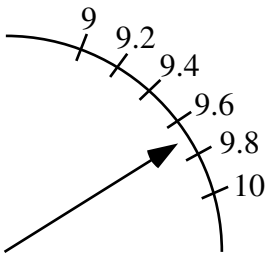
   (A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **(E)** 6

2. $0.8 - 0.07$ equals

   (A) 0.1 **(B)** 0.71 **(C)** 0.793 **(D)** 0.01 **(E)** 0.73

3. Contestants on "Gauss Reality TV" are rated by an applause metre. In the diagram, the arrow for one of the contestants is pointing to a rating that is closest to

   (A) 9.4 **(B)** 9.3 **(C)** 9.7 **(D)** 9.9 **(E)** 9.5



4. Twelve million added to twelve thousand equals

   (A) 12 012 000 **(B)** 12 120 000 **(C)** 120 120 000
   (D) 12 000 012 000 **(E)** 12 012 000 000

5. The largest number in the set $\{0.109, 0.2, 0.111, 0.114, 0.19\}$ is

   (A) 0.109 **(B)** 0.2 **(C)** 0.11 **(D)** 0.114 **(E)** 0.19

6. At a class party, each student randomly selects a wrapped prize from a bag. The prizes include books and calculators. There are 27 prizes in the bag. Meghan is the first to choose a prize. If the probability of Meghan choosing a book for her prize is $\frac{2}{3}$, how many books are in the bag?

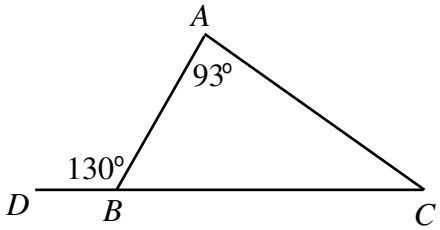
   (A) 15 **(B)** 9 **(C)** 21 **(D)** 7 **(E)** 18

7. Karen has just been chosen the new "Math Idol". A total of 1 480 000 votes were cast and Karen received 83% of them. How many people voted for her?

   (A) 830 000 **(B)** 1 228 400 **(C)** 1 100 000 **(D)** 251 600 **(E)** 1 783 132

8. In the diagram, the size of $\angle ACB$ is

   (A) 57° **(B)** 37° **(C)** 47° **(D)** 60° **(E)** 17°



9. A movie theatre has eleven rows of seats. The rows are numbered from 1 to 11. Odd-numbered rows have 15 seats and even-numbered rows have 16 seats. How many seats are there in the theatre?

   (A) 176 **(B)** 186 **(C)** 165 **(D)** 170 **(E)** 171

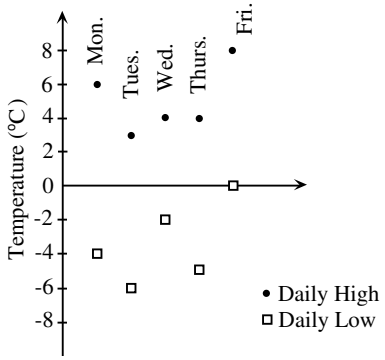
10. In relation to Smiths Falls, Ontario, the local time in St. John's, Newfoundland, is 90 minutes ahead, and the local time in Whitehorse, Yukon, is 3 hours behind. When the local time in St. John's is 5:36 p.m., the local time in Whitehorse is

(A) 1:06 p.m. **(B)** 2:36 p.m. **(C)** 4:06 p.m. **(D)** 12:06 p.m. **(E)** 10:06 p.m.

Part B: Each correct answer is worth 6.

11. The temperature range on a given day is the difference between the daily high and the daily low temperatures. On the graph shown, which day has the greatest temperature range?

(A) Monday **(B)** Tuesday **(C)** Wednesday **(D)** Thursday **(E)** Friday

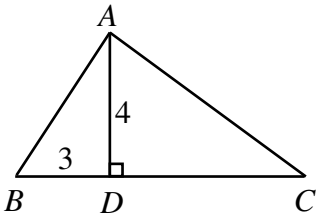


12. A bamboo plant grows at a rate of 105 cm per day. On May 1st at noon it was 2 m tall. Approximately how tall, in metres, was it on May 8th at noon?

(A) 10.40 **(B)** 8.30 **(C)** 3.05 **(D)** 7.35 **(E)** 9.35

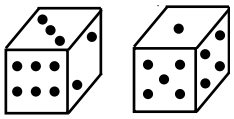
13. In the diagram, the length of DC is twice the length of BD. The area of the triangle ABC is

(A) 24 **(B)** 72 **(C)** 12 **(D)** 18 **(E)** 36



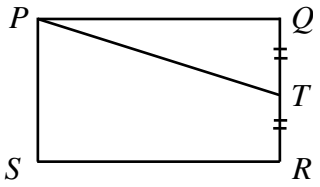
14. The numbers on opposite sides of a die total 7. What is the sum of the numbers on the unseen faces of the two dice shown?

(A) 14 **(B)** 20 **(C)** 21 **(D)** 24 **(E)** 30



15. In the diagram, the area of rectangle $PQRS$ is 24. If $TQ = TR$, the area of quadrilateral $PTRS$ is

(A) 18 **(B)** 20 **(C)** 16 **(D)** 6 **(E)** 15



16. Nicholas is counting the sheep in a flock as they cross a road. The sheep begin to cross the road at 2:00 p.m. and cross at a constant rate of three sheep per minute. After counting 42 sheep, Nicholas falls asleep. He wakes up an hour and a half later, at which point exactly half of the total flock has crossed the road since 2:00 p.m. How many sheep are there in the entire flock?

(A) 630 **(B)** 621 **(C)** 582 **(D)** 624 **(E)** 618

17. The symbol $\begin{array}{|c|c|}\hline 3 & 4 \\ \hline 5 & 6 \\ \hline \end{array}$ is evaluated as $3 \times 6 + 4 \times 5 = 38$. If $\begin{array}{|c|c|}\hline 2 & 6 \\ \hline 1 & \\ \hline \end{array}$ is evaluated as 16, then the number that should be placed in the empty space is

(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **(E)** 5

18. A game is said to be fair if your chance of winning is equal to your chance of losing. How many of the following games, involving tossing a regular six-sided die, are fair?
- You win if you roll a 2
- You win if you roll an even number
- You win if you roll a number less than 4
- You win if you roll a number divisible by 3

(A) 0 **(B)** 1 **(C)** 2 **(D)** 3 **(E)** 4

19. Chris and Pat are playing catch. Standing 1 m apart, Pat first throws the ball to Chris and then Chris throws the ball back to Pat. Next, standing 2 m apart, Pat throws to Chris and Chris throws back to Pat. After each pair of throws, Chris moves 1 m farther away from Pat. They stop playing when one of them misses the ball. If the game ends when the 29th throw is missed, how far apart are they standing and who misses catching the ball?

(A) 15 m, Chris **(B)** 15 m, Pat **(C)** 14m, Chris **(D)** 14 m, Pat **(E)** 16 m, Pat

20. While driving at 80 km/h, Sally's car passes a hydro pole every four seconds. Which of the following is closest to the distance between two neighbouring hydro poles?

(A) 50 m **(B)** 60 m **(C)** 70 m **(D)** 80 m **(E)** 90 m

Part C: Each correct answer is worth 8.

21. Emily was at a garage sale where the price of every item was reduced by 10% of its current price every 15 minutes. At 9:00 a.m., the price of a carpet was \$10.00. At 9:15 a.m., the price was reduced to \$9.00. As soon as the price of the carpet fell below \$8.00, Emily bought it. At what time did Emily buy the carpet?

(A) 9:45 a.m. **(B)** 9:15 a.m. **(C)** 9:30 a.m. **(D)** 10:15 a.m. **(E)** 10:00 a.m.

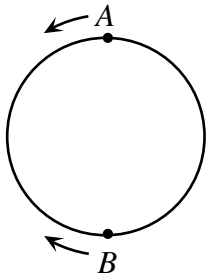
22. In a bin at the Gauss Grocery, the ratio of the number of apples to the number of oranges is $1:4$, and the ratio of the number of oranges to the number of lemons is $5:2$. What is the ratio of the number of apples to the number of lemons?

(A) $1:2$ **(B)** $4:5$ **(C)** $5:8$ **(D)** $20:8$ **(E)** $2:1$

23. Using an equal-armed balance, if □ □ □ □ balances ○ ○ and ○ ○ ○ balances △ △, which of the following would not balance △ ○ □?

(A) △ ○ □ **(B)** □ □ □ △ **(C)** □ □ ○ ○ **(D)** △ △ □ **(E)** ○ □ □ □ □

24. On a circular track, Alphonse is at point A and Beryl is diametrically opposite at point B. Alphonse runs counterclockwise and Beryl runs clockwise. They run at constant, but different, speeds. After running for a while they notice that when they pass each other it is always at the same three places on the track. What is the ratio of their speeds?



(A) $3:2$ **(B)** $3:1$ **(C)** $4:1$

(D) $2:1$ **(E)** $5:2$

25. How many different combinations of pennies, nickels, dimes and quarters use 48 coins to total \$1.00?

(A) 3 **(B)** 4 **(C)** 5 **(D)** 6 **(E)** 8