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 15, 2002

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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 10 unanswered questions.

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

Part A: Each correct answer is worth 5.

1. When the numbers 8, 3, 5, 0, 1 are arranged from smallest to largest, the middle number is
   (A) 5　　(B) 8　　(C) 3　　(D) 0　　(E) 1

2. The value of $0.9 + 0.99$ is
   (A) 0.999　　(B) 1.89　　(C) 1.08　　(D) 1.98　　(E) 0.89

3. $\dfrac{2+1}{7+6}$ equals
   (A) $\dfrac{3}{13}$　　(B) $\dfrac{21}{76}$　　(C) $\dfrac{1}{21}$　　(D) $\dfrac{2}{13}$　　(E) $\dfrac{1}{14}$

4. 20% of 20 is equal to
   (A) 400　　(B) 100　　(C) 5　　(D) 2　　(E) 4

5. Tyesha earns \$5 per hour babysitting, and babysits for 7 hours in a particular week. If she starts the week with \$20 in her bank account, deposits all she earns into her account, and does not withdraw any money, the amount she has in her account at the end of the week is
   (A) \$35　　(B) \$20　　(C) \$45　　(D) \$55　　(E) \$65

6. Five rats competed in a 25 metre race. The graph shows the time that each rat took to complete the race. Which rat won the race?
   (A) Allan　　(B) Betsy　　(C) Caelin
   (D) Devon　　(E) Ella
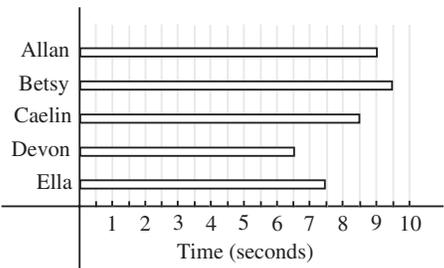
7. The mean (average) of the numbers 12, 14, 16, and 18, is
   (A) 30　　(B) 60　　(C) 17　　(D) 13　　(E) 15

8. If $P = 1$ and $Q = 2$, which of the following expressions is **not** equal to an integer?
   (A) $P + Q$　　(B) $P \times Q$　　(C) $\dfrac{P}{Q}$　　(D) $\dfrac{Q}{P}$　　(E) P^Q

9. Four friends equally shared $\dfrac{3}{4}$ of a pizza, which was left over after a party. What fraction of a whole pizza did each friend get?
   (A) $\dfrac{3}{8}$　　(B) $\dfrac{3}{16}$　　(C) $\dfrac{1}{12}$　　(D) $\dfrac{1}{16}$　　(E) $\dfrac{1}{8}$

10. Two squares, each with an area of 25 cm^2, are placed side by side to form a rectangle. What is the perimeter of this rectangle?
    (A) 30 cm　　(B) 25 cm　　(C) 50 cm　　(D) 20 cm　　(E) 15 cm

Part B: Each correct answer is worth 6.

11. After running 25% of a race, Giselle had run 50 metres. How long was the race, in metres?
    (**A**) 100   (**B**) 1250   (**C**) 200   (**D**) 12.5   (**E**) 400

12. Qaddama is 6 years older than Jack. Jack is 3 years younger than Doug. If Qaddama is 19 years old, how old is Doug?
    (**A**) 17   (**B**) 16   (**C**) 10   (**D**) 18   (**E**) 15

13. A palindrome is a positive integer whose digits are the same when read forwards or backwards. For example, 2002 is a palindrome. What is the smallest number which can be added to 2002 to produce a larger palindrome?
    (**A**) 11   (**B**) 110   (**C**) 108   (**D**) 18   (**E**) 1001

14. The first six letters of the alphabet are assigned values A = 1, B = 2, C = 3, D = 4, E = 5, and F = 6. The value of a word equals the sum of the values of its letters. For example, the value of BEEF is $2 + 5 + 5 + 6 = 18$. Which of the following words has the greatest value?
    (**A**) BEEF   (**B**) FADE   (**C**) FEED   (**D**) FACE   (**E**) DEAF

15. In the diagram, $AC = 4$, $BC = 3$, and $BD = 10$. The area of the shaded triangle is
    (**A**) 14   (**B**) 20   (**C**) 28
    (**D**) 25   (**E**) 12
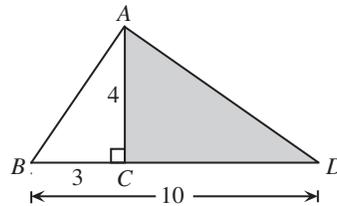
16. In the following equations, the letters a, b and c represent different numbers.
    $$1^3 = 1$$
    $$a^3 = 1 + 7$$
    $$3^3 = 1 + 7 + b$$
    $$4^3 = 1 + 7 + c$$

    The numerical value of $a + b + c$ is
    (**A**) 58   (**B**) 110   (**C**) 75   (**D**) 77   (**E**) 79

17. In the diagram, the value of z is
    (**A**) 150   (**B**) 180   (**C**) 60
    (**D**) 90   (**E**) 120
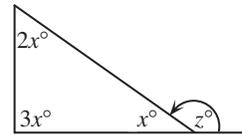
18. A perfect number is an integer that is equal to the sum of all of its positive divisors, except itself. For example, 28 is a perfect number because $28 = 1 + 2 + 4 + 7 + 14$. Which of the following is a perfect number?
    (**A**) 10   (**B**) 13   (**C**) 6   (**D**) 8   (**E**) 9

19. Subesha wrote down Davina's phone number in her math binder. Later that day, while correcting her homework, Subesha accidentally erased the last two digits of the phone number, leaving 893-44_ _. Subesha tries to call Davina by dialing phone numbers starting with 893-44. What is the least number of phone calls that she has to make to be guaranteed to reach Davina's house?
    (**A**) 100   (**B**) 90   (**C**) 10   (**D**) 1000   (**E**) 20

20. The word "stop" starts in the position shown in the diagram to the right. It is then rotated 180° clockwise about the origin, O, and this result is then reflected in the x-axis. Which of the following represents the final image?

(A) p o t s

(B) d o ı s

(C) p o t s

(D) s t o p

(E) q o ı z
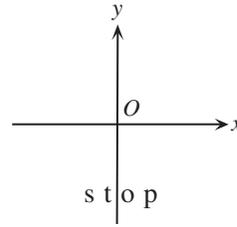
Part C: Each correct answer is worth 8.

21. Five people are in a room for a meeting. When the meeting ends, each person shakes hands with each of the other people in the room exactly once. The total number of handshakes that occurs is
(A) 5   (B) 10   (C) 12   (D) 15   (E) 25

22. The figure shown can be folded along the lines to form a rectangular prism. The surface area of the rectangular prism, in cm^2, is
(A) 312   (B) 300   (C) 280
(D) 84   (E) 600
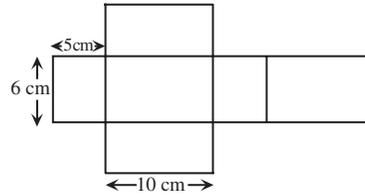
23. Mark has a bag that contains 3 black marbles, 6 gold marbles, 2 purple marbles, and 6 red marbles. Mark adds a number of white marbles to the bag and tells Susan that if she now draws a marble at random from the bag, the probability of it being black or gold is $\frac{3}{7}$. The number of white marbles that Mark adds to the bag is
(A) 5   (B) 2   (C) 6   (D) 4   (E) 3

24. $PQRS$ is a square with side length 8. X is the midpoint of side PQ, and Y and Z are the midpoints of XS and XR, respectively, as shown. The area of trapezoid $YZRS$ is
(A) 24   (B) 16   (C) 20
(D) 28   (E) 32
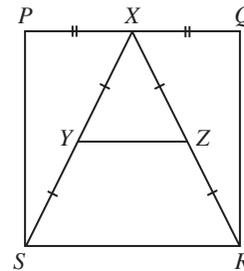
25. Each of the integers 226 and 318 have digits whose product is 24. How many three-digit positive integers have digits whose product is 24?
(A) 4   (B) 18   (C) 24   (D) 12   (E) 21

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