The CENTRE for EDUCATION
in MATHEMATICS and COMPUTING
cemc.uwaterloo.ca

Gauss Contest

Grade 7

(The Grade 8 Contest is on the reverse side)

Wednesday, May 14, 2025
(in North America and South America)

Thursday, May 15, 2025
(outside of North America and South America)

Time: 1 hour

Calculating devices are allowed, provided that they do not have any of the following features: (i) internet access, (ii) the ability to communicate with other devices, (iii) information previously stored by students (such as formulas, programs, notes, etc.), (iv) a computer algebra system, (v) dynamic geometry software.

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.

The name, school and location of some top-scoring students will be published on the website, cemc.uwaterloo.ca. On this website, you will also be able to find copies of past Contests and excellent resources for enrichment, problem solving and contest preparation.

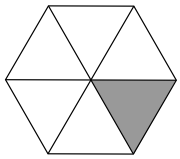
Scoring: There is *no penalty* for an incorrect answer.
Each unanswered question is worth 2, to a maximum of 10 unanswered questions.

Part A: Each correct answer is worth 5.

1. In a group of 12 friends, each friend gives \$5 to a charity. How much money does the group give in total?

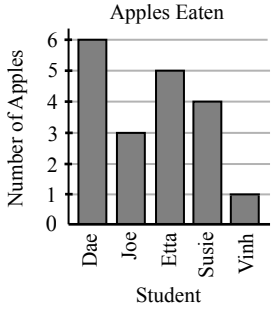
   (A) \$50 **(B)** \$55 **(C)** \$60 **(D)** \$65 **(E)** \$70

2. In the diagram, what fraction of the area of the regular hexagon is shaded?



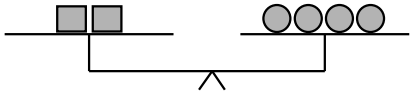
   (A) $\frac{1}{3}$ **(B)** $\frac{1}{4}$ **(C)** $\frac{1}{7}$
   (D) $\frac{1}{2}$ **(E)** $\frac{1}{6}$

3. The graph shows the number of apples that each of five students ate during a week. Which student ate the greatest number of apples?



   (A) Dae **(B)** Joe **(C)** Etta
   (D) Susie **(E)** Vinh

4. The equal-arm scale shown is balanced.
   One ▭ has the same mass as

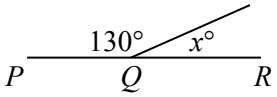


   (A) ○
   (B) ○○
   (C) ○○○
   (D) ○○○○
   (E) ○○○○○○○○

5. Which of the following is equal to the area of a square with side length 8?

   (A) 8×2 **(B)** $2\times(8+8)$ **(C)** 8×8 **(D)** 4×8 **(E)** $8\times8\times8\times8$

6. In the diagram, $\angle PQR$ is a straight angle.
   The value of x is



   (A) 60 **(B)** 40 **(C)** 50
   (D) 70 **(E)** 65

7. The list of seven numbers 3, 15, 8, 8, 9, 9, n has exactly one mode, which is 8. What is the value of n?

   (A) 15 **(B)** 9 **(C)** 3 **(D)** 8 **(E)** 10

8. Sam has only one measuring container. The volume of this container is $\frac{1}{2}$ cup. A recipe needs $2\frac{1}{2}$ cups of flour. How many times does Sam fill his $\frac{1}{2}$ cup container to accurately measure the flour for this recipe?

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

9. The month of June has 30 days. If in a certain year June 1 is on a Tuesday, on which day of the week is June 30?

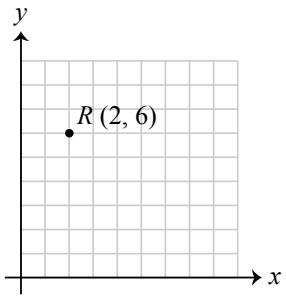
(A) Monday **(B)** Tuesday **(C)** Wednesday **(D)** Thursday **(E)** Friday

10. The words "P U G F O R S A L E" are written on a store window. How many of these ten letters look the same when viewed from both sides of the window?

(A) 3 **(B)** 4 **(C)** 5 **(D)** 6 **(E)** 7

Part B: Each correct answer is worth 6.

11. The coordinates of R are $(2, 6)$, as shown. After which of these translations will R move to the point $(7, 0)$?



(A) right 9, down 6
(B) left 5, up 6
(C) right 6, down 5
(D) left 6, down 5
(E) right 5, down 6

12. A train stops at Waterloo Station every 3 minutes. A bus stops at Waterloo Station every 5 minutes. A train and a bus both stop at Waterloo Station at 6:25 a.m. The next time that a train and a bus both stop at Waterloo Station at the same time is

(A) 6:28 a.m. **(B)** 6:30 a.m. **(C)** 6:33 a.m. **(D)** 6:40 a.m. **(E)** 6:55 a.m.

13. The numbers 2, 0, 2, 5 are repeated to form the pattern 2, 0, 2, 5, 2, 0, 2, 5, ...
If a total of 50 numbers are written, how many times will the number 5 appear?

(A) 10 **(B)** 11 **(C)** 12 **(D)** 13 **(E)** 25

14. What number goes in the box so that $\frac{28}{32} + \frac{1}{\square} = 1$?

(A) 24 **(B)** -3 **(C)** 7 **(D)** 16 **(E)** 8

15. Two standard six-sided dice are rolled. If the two numbers on the top faces are added, which of the following sums is least likely?

(A) 7 **(B)** 8 **(C)** 9 **(D)** 10 **(E)** 11

16. Each of the digits 7, 1, 3, 6, 8, and 2 is placed into one of the squares below to make an expression containing three 2-digit numbers.

$$\square\square + \square\square - \square\square$$

When the first two 2-digit numbers are added and the third is subtracted, the greatest possible result is

(A) 139 **(B)** 145 **(C)** 147 **(D)** 149 **(E)** 138

17. Savanah tossed a fair coin some number of times and 50% of those tosses resulted in tails. She then tossed the coin one final time and the result was tails. If 60% of all tosses resulted in tails, how many tosses did she make in total?

(A) 3 **(B)** 9 **(C)** 8 **(D)** 5 **(E)** 10

18. Four of the angle measurements $62°, 85°, 99°, 108°, 114°$ are the measures of the angles in the same quadrilateral. Which angle measure is not?

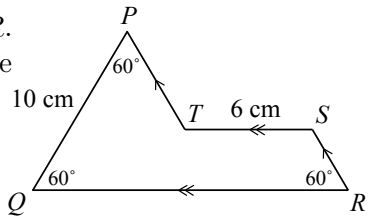
(A) 62° **(B)** 85° **(C)** 99° **(D)** 108° **(E)** 114°

19. Ten students each receive a card numbered with a different integer from 10 to 19. The students are each given the checklist shown and they check off each box that describes their number. How many students check off exactly two boxes?

☐ Odd Number
☐ Even Number
☐ Prime Number
☐ Composite Number
☐ Perfect Square

(A) 10 **(B)** 9 **(C)** 8
(D) 7 **(E)** 6

20. In the diagram, $\angle PQR = \angle QRS = \angle TPQ = 60°$. Also, PT is parallel to SR and TS is parallel to QR. If $PQ = 10$ cm and $TS = 6$ cm, the perimeter of figure $PQRST$ is



(A) 42 cm **(B)** 36 cm **(C)** 40 cm
(D) 38 cm **(E)** 44 cm

Part C: Each correct answer is worth 8.

21. Three circles have radii 1 cm, 5 cm, and x cm. If the mean (average) area of the three circles is 30π cm^2, the value of x is

(A) 64 **(B)** 5 **(C)** 24 **(D)** 8 **(E)** 2

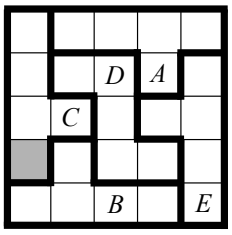
22. Each of three doors is painted one colour: either black or white or gold. Each colour is equally likely to be chosen for each door. What is the probability that at least one colour is not used?

(A) $\frac{7}{9}$ **(B)** $\frac{5}{9}$ **(C)** $\frac{20}{27}$ **(D)** $\frac{2}{9}$ **(E)** $\frac{2}{3}$

23. Suppose a, b and c are the last three digits of the six-digit integer $N = 111\,abc$. If N is divisible by 18, how many possibilities are there for N?

(A) 50 **(B)** 55 **(C)** 56 **(D)** 110 **(E)** 112

24. In the diagram, each row, each column, and each shape shown by the thick lines must contain the letters A, B, C, D, and E. If each square contains exactly one letter, what letter must be placed in the shaded square?



(A) A **(B)** B **(C)** C
(D) D **(E)** E

25. In an *arithmetic grid*, adjacent numbers increase by a fixed integer $a > 0$ moving left to right within each row. Also, adjacent numbers increase by a fixed integer $b > 0$ moving top to bottom within each column. For example, the grid shown is a 3×3 arithmetic grid with $a = 2$ and $b = 5$.

1	3	5
6	8	10
11	13	15

Suppose that an 8×8 arithmetic grid has a 1 in the top left corner, and a number less than 75 in the bottom right corner. How many such grids have a 45 somewhere in column 5?

(A) 6 **(B)** 3 **(C)** 7 **(D)** 5 **(E)** 4