



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

# **Gauss Contest**

## **Grade 8**

*(The Grade 7 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)*



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**Time:** 1 hour

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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.

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*The name, school and location of some top-scoring students will be published on the website, [cemc.uwaterloo.ca](http://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.

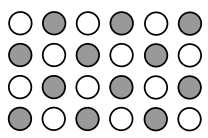
Each unanswered question is worth 2, to a maximum of 10 unanswered questions.

**Part A: Each correct answer is worth 5.**

- In the diagram, how many of the 24 circles are shaded?
 

(A) 10                      (B) 12                      (C) 14

(D) 16                      (E) 18


- Seong-hun had 36 dried apricot pieces that he gave to his 4 children. Each child received the same number of pieces. How many pieces did each child receive?
 

(A) 12                      (B) 6                      (C) 3                      (D) 9                      (E) 10
- Recycling is picked up every two weeks. Recycling was last picked up on May 12. On what date is the recycling picked up next?
 

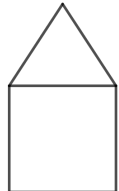
(A) May 19                      (B) May 20                      (C) May 25                      (D) May 26                      (E) May 27
- At 8:45 a.m., Aisha starts a movie that is 2 hours and 45 minutes long. If she watches the movie all the way through without a pause or a break, at what time will it finish?
 

(A) 10:30 a.m.                      (B) 11:15 a.m.                      (C) 11:30 a.m.                      (D) 10:50 a.m.                      (E) 10:45 a.m.
- If  $7x - 3 = 60$ , the value of  $x$  is
 

(A) 9                      (B) 7                      (C) 10                      (D) 6                      (E) 8
- A figure is made by placing a triangle on top of a square, as shown. The triangle is coloured either red or yellow. The square is coloured either blue or purple or green. How many different ways can the figure be coloured?
 

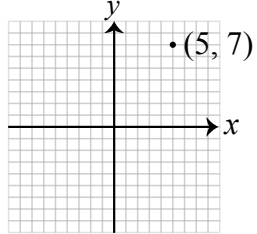
(A) 5                      (B) 3                      (C) 9

(D) 6                      (E) 2


- The point  $(5, 7)$  is plotted on the graph shown. When  $(5, 7)$  is reflected in the  $x$ -axis, the resulting point is
 

(A)  $(5, -7)$                       (B)  $(-5, -7)$                       (C)  $(5, 7)$

(D)  $(7, 5)$                       (E)  $(-7, -5)$


- Each of Mrs. Myer's students voted exactly once for their favourite season. Which of the following statements about the results in the graph shown is *false*?
 

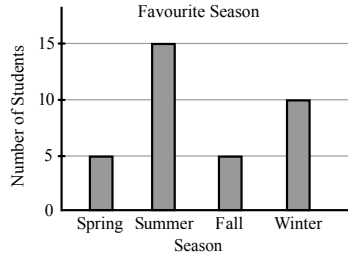
(A) Five students voted for Fall.

(B) Winter received more votes than Spring.

(C) Thirty-five students participated in this survey.

(D) More than half of the students voted for Summer.

(E) Fall and Spring received the same number of votes.


- Ruhab wrote the list 5, 2, 8, 7, 9 and then erased one of the five digits. The sum of the remaining four digits was a multiple of 4. Which number did she erase?
 

(A) 5                      (B) 2                      (C) 8                      (D) 7                      (E) 9

10. An integer from 3 to 20, inclusive, is randomly selected. What is the probability that the integer selected is a perfect square?

(A)  $\frac{3}{20}$       (B)  $\frac{1}{9}$       (C)  $\frac{1}{6}$       (D)  $\frac{1}{10}$       (E)  $\frac{2}{9}$

**Part B: Each correct answer is worth 6.**

11. 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

12. Leticia can walk 1.5 km in 20 minutes. Walking at this same rate, how far does Leticia walk in 4 hours?

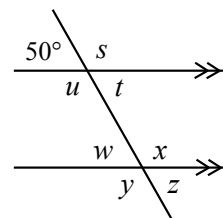
(A) 18 km      (B) 30 km      (C) 22.5 km      (D) 15 km      (E) 4.5 km

13. A list of one-digit integers contains exactly one 1, two 2s, three 3s, four 4s, five 5s, and six 6s. What is the median of this list?

(A) 2      (B) 3      (C) 4      (D) 5      (E) 6

14. In the diagram, which of the following pairs of angles have measures whose sum is equal to  $180^\circ$ ?

(A)  $w$  and  $z$       (B)  $x$  and  $y$       (C)  $u$  and  $x$   
 (D)  $t$  and  $y$       (E)  $s$  and  $x$



15. The ages of three students are consecutive integers. Their mean (average) age is 13. A fourth student joins the group and the mean of their four ages is 14. How old is the fourth student?

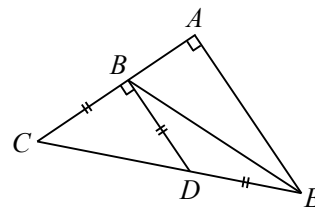
(A) 15      (B) 18      (C) 16      (D) 14      (E) 17

16. At Doggy Daycare, there is one dog for every bowl of food, two dogs for every bowl of water, and three dogs for every bowl of treats. Every dog gets a serving of food, water and treats. If there are a total of 77 bowls, how many dogs are there?

(A) 35      (B) 77      (C) 42      (D) 11      (E) 24

17. Points  $B$  and  $D$  lie on sides  $AC$  and  $CE$ , respectively, of  $\triangle ACE$ , as shown. If  $\angle CAE = \angle CBD = 90^\circ$  and  $CB = BD = DE$ , the measure of  $\angle ABE$  is

(A)  $60^\circ$       (B)  $67.5^\circ$       (C)  $70^\circ$   
 (D)  $75^\circ$       (E)  $52.5^\circ$



18. Two standard six-sided dice are rolled. If the two numbers on the top faces are multiplied, which of the following products is most likely?

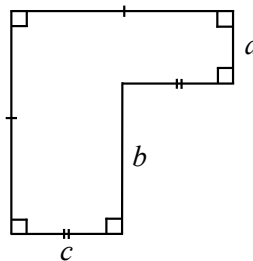
(A) 4      (B) 6      (C) 9      (D) 15      (E) 8

19. How many ordered pairs of positive integers  $(m, n)$  are there so that  $m^2 \times n = 2025$ ?

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

20. In the diagram, each of  $a$ ,  $b$  and  $c$  is greater than zero. Which of the following expressions is *not* equal to the perimeter of this polygon?

- (A)  $4a + 4b$   
 (B)  $a + b + 7c$   
 (C)  $8c$   
 (D)  $2a + 2b + 4c$   
 (E)  $3a + 3b + 2c$



**Part C: Each correct answer is worth 8.**

21. In the diagram, each letter from  $A$  to  $H$  is equal to a different integer from 1 to 8. Also,

- $H$  is a perfect square and is 1 more than  $D$
- 5 and 8 are in the same row
- $C$  is a multiple of both  $G$  and  $D$
- $B$  is the largest prime number in the set
- The value of  $B + G$  is even

$A$	$E$
$B$	$F$
$C$	$G$
$D$	$H$

What is the value of  $F$ ?

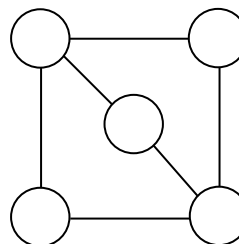
- (A) 2                      (B) 6                      (C) 1  
 (D) 7                      (E) 8
22.  $ABCD$  has vertices  $A(-3, -2)$ ,  $B(0, r)$ ,  $C(6, 10)$ , and  $D(s, t)$ .  $AB$  is parallel to  $CD$ ,  $BC$  is parallel to  $AD$ , and  $r < 0$ . What is the value of  $r + s + t$ ?
- (A) 10                      (B) 11                      (C) 12                      (D) 13                      (E) 14

23. The number 2013 is multiplied by a positive integer  $n$ . The last four digits of the result are 2025. What is the sum of the digits of the smallest possible value of  $n$ ?

- (A) 17                      (B) 13                      (C) 15                      (D) 14                      (E) 16

24. In the diagram, circles are *connected* if they are joined by a line segment. Each circle is filled with one integer so that

- the positive difference between each pair of integers in connected circles is  $d$ , and
- the sum of the five integers in the circles is 54.



For how many different values of  $d$  between 1 and 20 inclusive can the circles be filled in this way?

- (A) 4                      (B) 12                      (C) 8  
 (D) 20                      (E) 16
25. The list 11, 12, 14, 23, 31, 44, 45, 46, 56, 64, 67, 74 can be arranged so that the units digit of each number matches the tens digit of the number that follows it. For example, 12, 23, 31, 11, 14, 44, 45, 56, 67, 74, 46, 64 is one such arrangement. How many such arrangements of the given list are possible?

- (A) 18                      (B) 24                      (C) 36                      (D) 30                      (E) 12