

First name: \_\_\_\_\_ Last name: \_\_\_\_\_

Student ID: \_\_\_\_\_

**Calculation and Operation Homework****Basic problems:****1. Complete. Show work!**

1. $36 \times (-30) - (-39) + 23$	2. $(-44) \div (-11) - (-49)$
3. $47 \times 41 - 10 - (-40)$	4. $46 + (7 - 52 \div 4 + 39)$
5. $-10 + 22 + (-0.9) + 1$	6. $-11.5 + 43 + (-48) + (-7.9) - (-9.5)$
7. $(-3)^2 \times 4^0$	8. $-(3)^2 \times 4^0$

**2. Fill in the missing negative signs to complete each equation.**

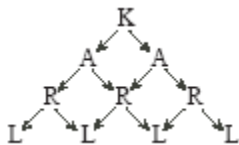
1. $\_\_42 - \_\_9 \times \_\_10 + \_\_9 = -123$
2. $\_\_21 - \_\_38 \times \_\_22 - \_\_45 + \_\_31 = -891$

**Challenge problems:**

1. Evaluate  $10 \leftarrow (9 \leftarrow 8)$  if  $x \leftarrow y = 2x - xy$ .

2. Find the smallest natural number value of  $n$  if  $240n$  is a perfect square.

3. In the diagram, how many paths can be taken to spell “KARL”?



4. In a softball league, after each team has played every other team 4 times, the total accumulated points are: Lions 22, Tigers 19, Mounties 14, and Royals 12. If each team received 3 points for a win, 1 point for a tie and no points for a loss, how many games ended in a tie?

5. In a basketball shooting competition, each competitor shoots ten balls which are numbered from 1 to 10. The number of points earned for each successful shot is equal to the number on the ball. If a competitor misses exactly two shots, which one of the following scores is not possible?

- (A) 52   (B) 44   (C) 41   (D) 38   (E) 35

6. 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 416-893-44\_\_\_. What is the least number of phone calls that she has to make to be guaranteed to reach Davina's house?

7. Rishi got the following marks on four math tests: 71, 77, 80, and 87. He will write one more math test. Each test is worth the same amount and all marks are between 0 and 100. Which of the following is a possible average for his five math tests?

- (A) 88   (B) 62   (C) 82   (D) 84   (E) 86

8. The whole numbers from 1 to 1000 are written. How many of these numbers have at least two 7's appearing side-by-side?

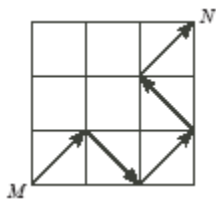
9. In the 2024 Math Olympics, there are six competitors and eight events. The top three competitors in each event receive gold (5 points), silver (3 points), and bronze (1 point) medals; there are no ties at the Gauss Olympics. If Sora had a total of 27 points, what is the maximum number of silver medals she could have won?

10. In the addition of two 2-digit numbers, each blank space, including those in the answer, is to be filled with one of the digits 0, 1, 2, 3, 4, 5, 6, each used exactly once. What is the unit digit of the sum?

$$\begin{array}{r} \square\square \\ + \square\square \\ \hline \square\square? \end{array}$$

11. A triangle can be formed having side lengths 4, 5 and 8. It is impossible, however, to construct a triangle with side lengths 4, 5 and 10. Using the side lengths 2, 3, 5, 7 and 11, how many different triangles with exactly two equal sides can be formed?

12. Kira can draw a connected path from M to N by drawing arrows along only the diagonals of the nine squares shown. One such possible path is shown. A path cannot pass through the interior of the same square twice. In total, how many different paths can she draw from M to N?



13. In a game, the number of points scored when a marble is rolled through a hole is the number above it. There are three sizes of marbles: small, medium and large. The small marbles fit through any of the holes, the medium fit only through holes 3, 4 and 5, and the large fit only through hole 5. You may choose up to 10 marbles of each size to roll through the holes. For a score of 23, what is the maximum number of marbles that could have been rolled?

