UNIVERSITY OF NEW BRUNSWICK
and
UNIVERSITÉ DE MONCTON

40th NEW BRUNSWICK MATHEMATICS COMPETITION

Thursday, May 8th, 2025

GRADE 7

INSTRUCTIONS TO THE STUDENT:

1. Do not start the examination until you are told to do so.

2. For your calculations, use the blank pages at the end of the test in English. No other aids are necessary.

3. This is a multiple-choice test. Each problem is followed by five answers marked A, B, C, D, E. Only one is correct. When you have decided on your choice, mark the appropriate letter on your answer sheet using the pencil provided.

4. Problems worth 3 points each in Part A, 4 points each in part B and 5 points each in part C. A negative score worth a quarter of the problem's points is applied for any incorrect answer. There is no penalty for answers which are left blank.

5. Diagrams are not drawn to scale. They are intended as aids only.

6. You have 60 minutes to answer the questions.

7. All electronic devices (calculators, phones, etc.) are not allowed.

Part A

1. What is the value of $1 \times 2 \times 3 - (1 + 2 + 3)$?

   (A) 0 (B) 1 (C) 3 (D) 6 (E) 10

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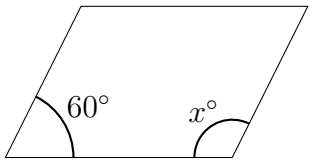
2. In the parallelogram shown, what is the value of x?



   (A) 30 (B) 60 (C) 100 (D) 120 (E) 300

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3. Which fraction is the greatest?

   (A) $\frac{7}{10}$ (B) $\frac{11}{18}$ (C) $\frac{15}{31}$ (D) $\frac{19}{37}$ (E) $\frac{23}{50}$

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4. All of these numbers are prime numbers. Which of these is also two more than another prime number? (Such pairs of prime numbers are called twin primes.)

   (A) 13 (B) 17 (C) 23 (D) 29 (E) 37

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5. We are in the month of May. What month will it be 100 months from now?

   (A) March (B) May (C) July (D) September (E) November

6. A number is called abundant if the sum of its proper factors is greater than the number itself. For example, the number 12 is abundant because

$$1 + 2 + 3 + 4 + 6 > 12.$$

Which of these numbers is abundant?

(A) 15 (B) 16 (C) 17 (D) 18 (E) 21

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7. What is the value of twelve thousands plus twelve hundreds plus twelve tens plus twelve ones?

(A) 12 132 (B) 12 332 (C) 13 222 (D) 13 232 (E) 13 332

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8. A class is at a skating party. It costs \$100 to rent the skating rink plus \$5 for lunch for each person. If the total cost is \$225, how many people are at the party?

(A) 21 (B) 22 (C) 23 (D) 25 (E) 32

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9. Which of these values is closest to 100?

(A) 2% of 4000
(B) 3% of 3000
(C) 4% of 2000
(D) 5% of 1000
(E) 25% of 500

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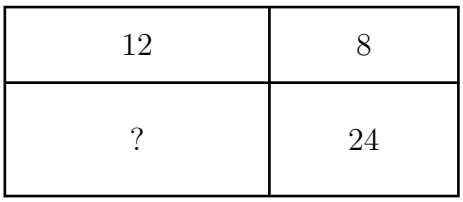
10. Anil should have divided a number by 5, but instead had added 5. Anil got the result of 95. What should Anil's result have been?

(A) 18 (B) 19 (C) 20 (D) 100 (E) 450

Part B

11. The areas of three small rectangles are given. What is the area of the fourth small rectangle?



(A) 4 (B) 16 (C) 28 (D) 36 (E) 44

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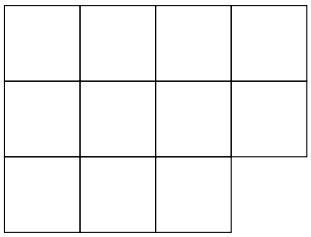
12. How many squares appear in this figure?



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

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13. When $\frac{1}{7}$ is written as a decimal, its value is $0.142857142857\ldots$ with the same digits repeating. What is the 2025^{th} digit after the decimal point?

(A) 2 (B) 4 (C) 5 (D) 7 (E) 8

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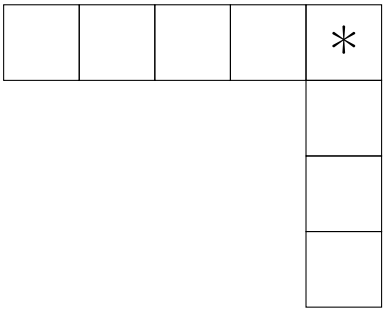
14. Six people all shook hands with everyone else. How many handshakes were there in total?

(A) 12 (B) 15 (C) 18 (D) 24 (E) 30

15. Each of the numbers 1, 2, 3, 4, 5, 6, 7 and 8 are each placed in a box as below so that the sums of the row and the column both equal 20. What number must be placed in the box marked by a $*$?



(A) 2 (B) 4 (C) 6 (D) 8 (E) More than one value works

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16. The average of 10 numbers is 14. After three of these numbers are erased, the average of the remaining numbers is 11. What is the average of the three numbers that were erased?

(A) 13 (B) 15 (C) 17 (D) 19 (E) 21

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17. Since $2025 = 45 \times 45$, it is called a perfect square. How many perfect squares are betwen 99 and 2024?

(A) 24 (B) 25 (C) 34 (D) 35 (E) 44

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18. If the lengths of the sides of a square are tripled, the perimeter increases by 400 cm. What is the length of a side of the original (smaller) square?

(A) 10 cm (B) 20 cm (C) 50 cm (D) 80 cm (E) 100 cm

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19. Four of these points lie on a straight line. Which point is not on that line?

(A) $(0, 5)$ (B) $(1, 7)$ (C) $(3, 11)$ (D) $(6, 19)$ (E) (10,25)

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20. Tickets are sold in packages of 5 or 9 only. What is the largest number of tickets that can not be exactly purchased?

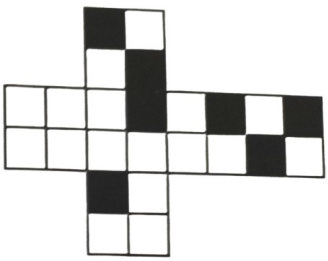
(A) 31 (B) 33 (C) 37 (D) 46 (E) 51

Partie C

21. It takes 2025 digit symbols in total to number the pages of a book. How many pages are in the book?

(A) between 670 and 680
(B) between 680 and 690
(C) between 690 and 700
(D) between 700 and 710
(E) between 710 and 720

22. Which of the cubes could be made by folding the net below?



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

23. M and N are negative integers and $M - N = 2$. P and Q are positive integers and $P - Q = -3$. R is an integer and $P + R$ is negative. Which of these could be the order of the values of the integers from smallest to largest?

(A) N, M, P, R, Q
(B) R, M, N, P, Q
(C) M, N, R, Q, P
(D) N, M, R, Q, P
(E) R, N, M, P, Q

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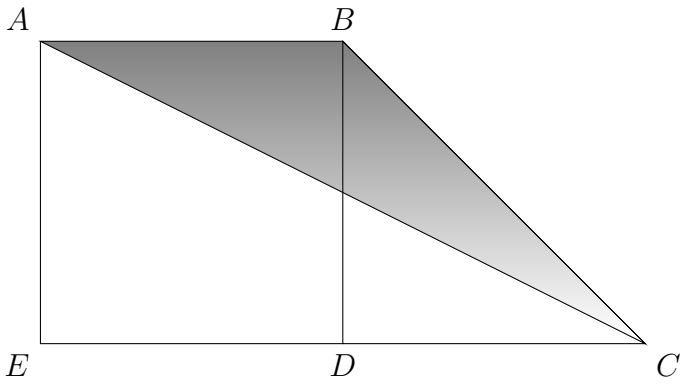
24. In the diagram shown, $ABDE$ is a square. Given $AB = 6$, and $EC = 8$, what fraction of the total area of $ABCDE$ is shaded?



(A) $2/7$ (B) $1/3$ (C) $3/8$ (D) $3/7$ (E) $1/2$

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25. Points Q,R,S, and T lie on the same line in that order. The ratio $QR : QS$ is $1 : 4$. and the ratio $RS : ST$ is $12 : 5$. What is the ratio $QR : RT$?

(A) $1 : 17$ (B) $1 : 11$ (C) $3 : 17$ (D) $3 : 13$ (E) $4 : 17$

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26. A total of 125 identical cubes are joined together to make a $5 \times 5 \times 5$ cube. The outside of the large cube is painted red before the cube is taken apart. The number of small cubes that are painted red on none of their faces is N and the number of small cubes that are painted red on three faces is T. What is the value of $N + T$?

(A) 31 (B) 32 (C) 35 (D) 40 (E) 63