UNIVERSITY OF NEW BRUNSWICK
and
UNIVERSITÉ DE MONCTON

40th NEW BRUNSWICK MATHEMATICS COMPETITION

Thursday, May 8th, 2025

GRADE 8

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 are 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 problems 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. Which of these is not a prime number?

   (A) 3 (B) 5 (C) 7 (D) 9 (E) 11

2. What is the value of $40 \times 2 - 3 \times 25 + 4$?

   (A) 1 (B) 9 (C) 29 (D) 34 (E) 169

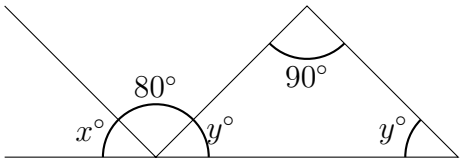
3. We are in the month of May. What month will it be 100 months from now?

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

4. Which of these values is the greatest?

   (A) 50% of 100 (B) 40% of 200 (C) 30% of 300 (D) 20% of 400 (E) 10% of 500

5. In the figure shown, what is the value of x?



   (A) 10 (B) 25 (C) 35 (D) 45 (E) 55

6. Anil should have divided a number by 5, but instead 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

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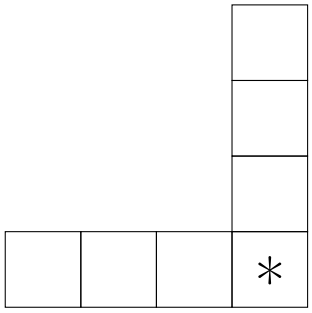
8. Each of the numbers 1,2,3,4,5,6 and 7 is placed in a box below so that the sums of the row and the column both equal 15. What number must be placed in the box marked $*$?



   (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

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9. What is the value of thirteen million plus thirteen hundred thousand plus thirteen hundred ?

   (A) 13 014 300 (B) 13 131 300 (C) 14 301 300 (D) 14 313 000 (E) 131 313 000

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10. How many square meters would be equivalent to one square kilometer ?

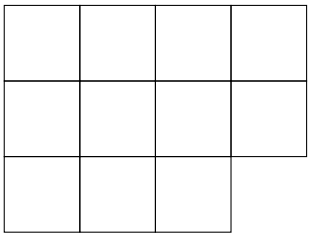
    (A) 100 (B) 1000 (C) 10 000 (D) 1 000 000 (E) 100 000 000

Part B

11. Which of these values could be the sum of four consecutive integers?

(A) 20 (B) 36 (C) 60 (D) 72 (E) 86

12. How many squares appear in this figure?



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

13. The mean weight of six soccer players is 50 kg and the mean weight of nine gymnasts is 40 kg. How many kg is the mean weight of the fifteen people?

(A) 42 (B) 44 (C) 45 (D) 46 (E) 48

14. The area of a small square increases by 75 cm^2 when the lengths of its sides are all doubled. What is the perimeter (in cm) of the small square?

(A) 10 (B) 20 (C) 40 (D) 50 (E) 100

15. Which number must be placed in the box to make the calculation correct?

$$\frac{\square}{21} - \frac{2}{7} = \frac{1}{3}$$

(A) 10 (B) 11 (C) 13 (D) 17 (E) 19

16. How many of the numbers between 100 and 1000 both end in 40 and are divisible by 40?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

17. 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

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

(A) (2,7) (B) (3,8) (C) (0,1) (D) (1,4) (E) (-2,-5)

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19. In this question, bars are placed above certain digits in a number. A bar changes the interpretation of the digit in base 10.

Digit with a bar : Its place value (ones, tens, hundreds, etc.) is subtracted.
Digit without a bar : Its place value is added normally.

For example, $\mathbf{9\overline{62}8 = 9 \times 1000 - 6 \times 100 - 2 \times 10 + 8 \times 1.}$
Which of these does *not* equal 2025 ?

(A) $\mathbf{203\overline{5}}$ (B) $\mathbf{21\overline{75}}$ (C) $\mathbf{21\overline{8}5}$ (D) $\mathbf{3\overline{8}25}$ (E) $\mathbf{3\overline{975}}$

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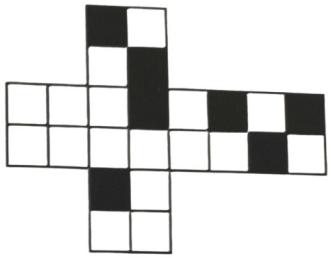
20. Which of the cubes could be made by folding the net below ?



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

Part C

21. Two red books and three green books are randomly placed in order on a shelf. What is the probability that the two red books are beside each other ?

(A) 1/5 (B) 3/10 (C) 2/5 (D) 1/2 (E) 3/5

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22. The sequence of numbers beginning at 1 is written (12345678910111213 ...). What is the 2025^{th} digit in the sequence ?

(A) 0 (B) 1 (C) 2 (D) 5 (E) 7

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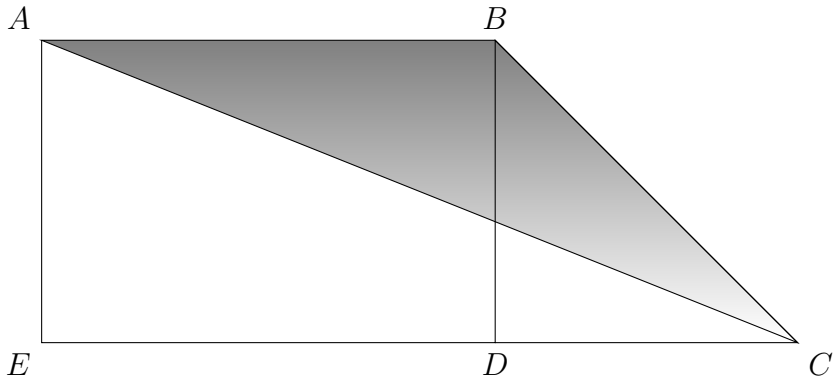
23. In the diagram shown, $ABDE$ is a square, $AB = 6$, and $AC = 10$. What fraction of the total area of $ABCDE$ is shaded ?



(A) $\frac{2}{7}$ (B) $\frac{1}{3}$ (C) $\frac{3}{8}$ (D) $\frac{3}{7}$ (E) $\frac{1}{2}$

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24. The mean, the median, and the only mode of a set of five positive integers all equal 9. If the largest and the smallest of these integers add to 19, how many possible values are there for the largest integer ?

(A) 5 (B) 6 (C) 7 (D) 8 (E) 9

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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) $1 : 5$ (C) $3 : 17$ (D) $4 : 17$ (E) $4 : 21$

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26. A, B, C, D, E, and F are all different digits, and they are such that the following sum holds :

$$\begin{array}{cccccc} & \mathrm{A} & \mathrm{B} & \mathrm{C} & \mathrm{D} \\ + & & & \mathrm{E} & \mathrm{F} \\ \hline & 2 & 0 & 2 & 5 \end{array}$$

For example, $(A, B, C, D, E, F) = (1, 9, 8, 5, 4, 0)$ is a solution because

$$1985 + 40 = 2025.$$

How many *other* solutions are there ?

(A) 7 (B) 9 (C) 11 (D) 13 (E) 15
