

UNIVERSITY OF NEW BRUNSWICK

UNIVERSITÉ DE MONCTON

**35th NEW BRUNSWICK
MATHEMATICS COMPETITION**

Friday, May 12th, 2017

GRADE 9

INSTRUCTIONS TO THE STUDENT:

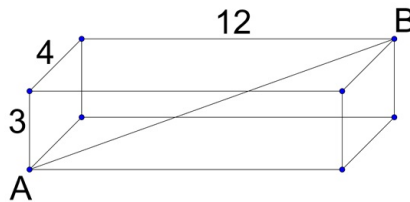
1. Do not start the examination until you are told to do so.
2. You are permitted to use rough paper. No other aids are necessary.
3. This is a multiple choice test. Each question is followed by five answers marked A, B, C, D, E. Only one is correct. When you have decided on your choice, mark the appropriate 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. The penalty for incorrect answers is one quarter of the points assigned for that question. No penalty is assessed 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. The use of calculators in the examination room is not allowed.

Part B

11. In a house there are three clocks. One clock chimes every 20 minutes. The second one chimes every 25 minutes and the last one chimes every 30 minutes. If at a given time all three clocks chime together for the first time, how many minutes later will the three clocks chime together for the sixth time?

(A) 600 (B) 750 (C) 1200 (D) 1500 (E) 1800

12. A 12 cm by 4 cm by 3 cm rectangular box is shown below. What is the length, in centimeters, of the diagonal AB?



(A) $\sqrt{153}$ (B) $\sqrt{160}$ (C) 13 (D) 17 (E) 19

13. If the value of $3 \times 3 \times 3 \times 3 \dots \times 3$ (where the number 3 appears 2017 times in the product) was written out in full, what would be the final digit?

(A) 1 (B) 3 (C) 5 (D) 7 (E) 9

14. A florist just received 210 red roses and 195 white roses. He wants to make large bouquets of roses, using all of the roses and combining red and white roses. He wants all bouquets to be identical. What is the largest number of bouquets that the florist can make?

(A) 12 (B) 13 (C) 14 (D) 15 (E) 16

15. In base 10, the value of 123 is $(1 \times 10 \times 10) + (2 \times 10) + (3 \times 1)$. If the number 123 was in base 7 it would be equal in base 10 to $(1 \times 7 \times 7) + (2 \times 7) + (3 \times 1) = 66$. If a number in base 7 is written 1111, what is the value of this number in base 10?

(A) 343 (B) 375 (C) 400 (D) 449 (E) 500

16. You visited a Chinese garden. You had to cross seven doors. At each door you had to leave half of the money you had plus \$1. If you are left with \$1 at the end, how many dollars did you have at the beginning?

- (A) 127 (B) 190 (C) 255 (D) 382 (E) 766

17. During the last big storm, 30 cm of snow fell on Mathtown, a city that has a rectangular shape, 3 km wide and 30 km long. If all the snow that has fallen on Mathtown during this storm would fill a very large cube of snow, what would be the length of its side in meters?

- (A) 30 (B) 100 (C) 300 (D) 1000 (E) 3000

18. Some friends contribute equally to buy a game. If each friend contributes \$3, they have \$2 more than needed. If each friend contributes \$2, they have \$2 less than needed. How many friends are there?

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

19. At Joe's fruit store, two apples and three oranges cost \$4.30 while four apples and one orange cost \$4.10. What is the cost of one apple and four oranges?

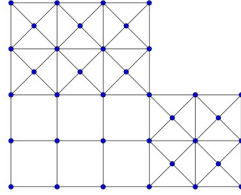
- (A) \$4.10 (B) \$4.20 (C) \$4.30 (D) \$4.40 (E) \$4.50

20. The earth's radius is roughly 6375 km. The moon's radius is roughly 1735 km. Knowing that the volume of a sphere of radius r is equal to $\frac{4}{3}\pi r^3$, what would be, roughly, the result if the volume of the earth was divided by the volume of the moon?

- (A) 4 (B) 8 (C) 14 (D) 50 (E) 100
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Part C

21. How many squares are there in the following diagram ?

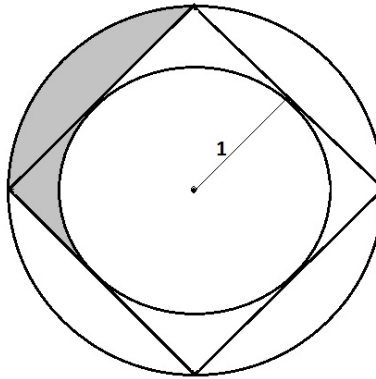


- (A) 25 (B) 30 (C) 35 (D) 40 (E) 45

22. John runs 25% faster than Ahcène. Ahcène runs 25% faster than Paul. Together they run a relay in which each one of them runs 1 km. If, together, they took 10 minutes to run these 3 km, what was the average speed of Ahcène in km/h ?

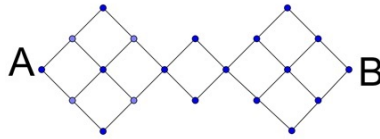
- (A) 6.1 (B) 18 (C) 18.3 (D) 36 (E) 36.6

23. The small circle has a radius equal to 1 and is inscribed in a square. The square is inscribed in the large circle. What is the area of the shaded region ?



- (A) $\frac{\pi}{4}$ (B) $\pi - 2$ (C) $2 - \frac{\pi}{4}$ (D) $\frac{\pi}{2}$ (E) $\pi - 1$

24. If you must always move to the right in the diagram below, horizontally or diagonally, how many different paths can you take from A to B?

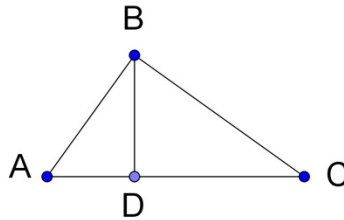


- (A) 36 (B) 54 (C) 72 (D) 90 (E) 128

25. How many integers between 1 and 1000 have exactly one 7 in their digits?

- (A) 190 (B) 235 (C) 243 (D) 252 (E) 260

26. Triangle ABC has a right angle at B.
BD is perpendicular to AC. If AB measures 3 cm and BC measures 4 cm, what is the measure of BD in cm?



- (A) 2 (B) $\frac{11}{5}$ (C) $\frac{12}{5}$ (D) $\frac{13}{5}$ (E) $\frac{14}{5}$