

UNIVERSITY OF NEW BRUNSWICK
UNIVERSITÉ DE MONCTON
34th NEW BRUNSWICK
MATHEMATICS COMPETITION

Friday, May 13th, 2016

GRADE 7

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 answer 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 A

1. Which of these is *not* a prime number?

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

2. Which of these is not equal to 10?

- (A) $\frac{1}{2} \times 20$ (B) $(5 - 3) \times 5$ (C) $1 + 4 \times 2$ (D) $80 \div 8$ (E) 0.1×100
-

3. How many two digit numbers have digits that add up to 10?

- (A) 6 (B) 7 (C) 8 (D) 9 (E) 10
-

4. A game began at 10:50 am and ended at 1:20 pm. How many minutes long was the game?

- (A) 140 (B) 150 (C) 210 (D) 230 (E) 250
-

5. How many *odd* positive integers less than 2016 leave no remainder when divided by 5?

- (A) 201 (B) 202 (C) 403 (D) 404 (E) 605
-

6. Which list has the numbers in increasing order from smallest to largest?

- (A) 0.2 0.14 0.032 0.43 0.00509
(B) 0.00509 0.032 0.14 0.43 0.2
(C) 0.2 0.14 0.43 0.032 0.00509
(D) 0.00509 0.032 0.14 0.2 0.43
(E) 0.14 0.2 0.43 0.032 0.00509
-

7. What does $2 - (\frac{1}{2} + \frac{2}{3})$ equal?

- (A) $\frac{1}{3}$ (B) $\frac{5}{8}$ (C) $\frac{5}{6}$ (D) $\frac{7}{6}$ (E) $\frac{7}{5}$

-
8. You are offered two plans for text messages. Plan A offers unlimited texting for \$20 monthly. Plan B charges a fee of \$5 monthly plus an additional charge of 5 cents for each text message. For the monthly charges to be exactly the same, how many text messages would a Plan B user need to send?

(A) 100 (B) 200 (C) 300 (D) 400 (E) 500

9. A flower garden is planted with 84 tulips and 96 roses. Each row contains only tulips or only roses. If each row must have the same number of flowers, what is the smallest possible number of rows in the garden?

(A) 13 (B) 14 (C) 15 (D) 18 (E) 26

10. Observe that the number 6 has four distinct positive factors: 1, 2, 3, and 6. How many distinct positive factors does the number 90 have?

(A) 6 (B) 8 (C) 9 (D) 10 (E) 12

Part B

11. The positive integers are written in rows, as shown. The first number in a row equals the number of integers in that row. Continuing this pattern in which row number will 2016 appear?

Row 1: 1
Row 2: 2 3
Row 3: 4 5 6 7
Row 4: 8 9 10 11 12 13 14 15

(A) 10 (B) 11 (C) 12 (D) 13 (E) 14

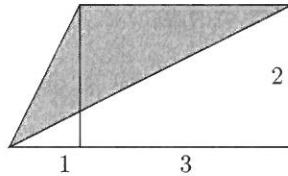
12. The Principal lines up all 63 students in the Grade 7 level of a middle school. It can be seen that there are never more than 3 girls together, what is the largest possible number of girls in this Grade 7 group?

(A) 21 (B) 28 (C) 32 (D) 39 (E) 48

13. The surface area of a cube is 150 square centimetres. How many cubic centimetres is the volume of the cube?

(A) 25 (B) 50 (C) 125 (D) 450 (E) 625

14. What is the area of the shaded region?



(A) 1.5 (B) 2 (C) 2.5 (D) 3 (E) 4

15. A balanced scale has three squares and one triangle on a side and 15 circles on the other side. A second scale has one triangle and one square balancing with seven circles. How many circles would be needed to balance with one triangle? (Note that all circles are identical, all squares are identical, and both triangles are identical.)

(A) 3 (B) 5 (C) 6 (D) 7 (E) 9

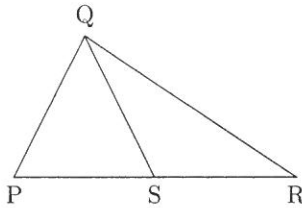
16. It is given that 8 is 10% of P and 20 is 50% of Q . What is the value of $\frac{P}{Q}$?

(A) $\frac{2}{25}$ (B) $\frac{1}{2}$ (C) $\frac{4}{5}$ (D) 2 (E) 8

17. The ages in years of two children and their mother add to 60. The sum of the children's ages is 10 years less than the mother's age. The older child is $\frac{2}{5}$ of the mother's age. How many years of age is the youngest child?

(A) 5 (B) 7 (C) 8 (D) 9 (E) 11

18. The lengths of PS, SR, and QS are equal. If angle SRQ measures 40° , what is the measure (in degrees) of angle PQR?



(A) 70 (B) 80 (C) 90 (D) 100 (E) 110

19. A total of 29 students in a class answered a survey about sports. Of these students there are 15 students who play soccer, 10 students who play hockey, and 12 students that play neither of these sports. How many of the students surveyed play both soccer and hockey?

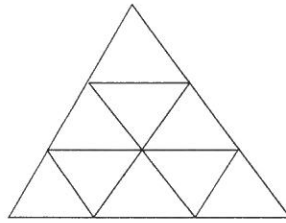
(A) 3 (B) 5 (C) 6 (D) 8 (E) 9

20. A mathematics contest consists of 26 questions. Seven points are awarded for each correct answer, and 3 points are deducted for each wrong answer. If a question is omitted, no points are awarded. If Richard got a score of 76 on the contest, how many questions did he answer correctly?

(A) 10 (B) 11 (C) 12 (D) 13 (E) 14

Part C

21. The large equilateral triangle below is broken into 9 smaller equilateral triangles, as shown. How many parallelograms appear in the diagram?



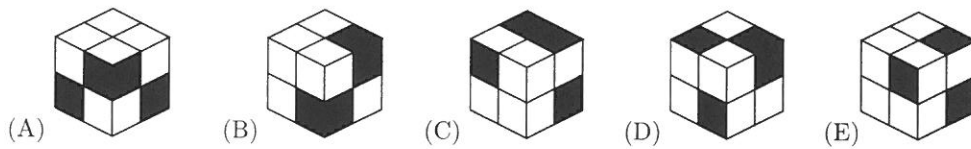
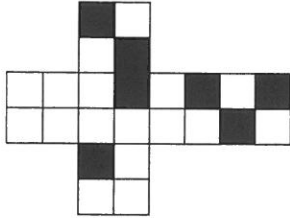
- (A) 8 (B) 10 (C) 12 (D) 13 (E) 15

-
22. The diagram shows a magic square in which the sums of the numbers in any row, column or diagonal are equal. What is the value of n ?

6	n	
7		9
11		

- (A) 8 (B) 10 (C) 11 (D) 12 (E) 13

23. Which of the cubes shown could be made from this net?



24. In the sequence 2016, 2013, 2005, 2002, 1994, 1991, ..., every number except for 2016 and 2013 is 11 less than some other number in this sequence. Which of these numbers will appear in the sequence?

- (A) 1 (B) 2 (C) 3 (D) 5 (E) 8

25. If all blips are blups and some blups are blips, which of the statements X, Y, Z must be true?

X : All blips are blups.

Y : Some blups are blips.

Z : Some blips are not blups.

- (A) X only (B) Y only (C) Z only (D) X and Y (E) Y and Z

26. Four numbers add up to 58. The following amounts are all equal to one another: the first number plus 1; the second number minus 2; the third number multiplied by 3; and the fourth number divided by 4. If the largest of the four numbers is A and the second largest is B , what is the value of $(A - B)$?

- (A) 17 (B) 19 (C) 21 (D) 23 (E) 25