School Name _____   Teacher Name_____ _____   /100

Student Name _____ _____(**Print** First, Last)   Grade _____

2019 Edmonton Junior High Math Contest

Part A: Multiple Choice	Part B (short answer)	Part C (short answer)
1.	8.	14.
2.	9.	15.
3.	10.	16.
4.	11.	17.
5.	12.	18.
6.	13.	19.
7.		

Part A: _____× 4 + _____ × 2 = _____   Blank answers ≤ 3.
      Correct   blank
Part B: _____× 5   = _____   MARKER
      Correct   ONLY
Part C: _____× 7   = _____
   Correct
Total: = _____

Instructions:

1. Calculator, grid paper and scrap paper are permitted. You may write on the booklet.
2. Programmable calculators and cell phones are not allowed.
3. Each correct answer in Part A is worth 4 points, each correct answer in Part B is worth 5 points, and each correct answer in Part C is worth 7 points. In Part A each blank is worth 2 points each up to a maximum of 3 blanks.
4. Each incorrect answer is worth 0 points.
5. Unanswered questions in Parts B and C are worth 0 points.
6. You have 60 minutes of writing time. It is recommended that you enter the answers on the Google form after the contest. This allows you the full 60 minutes of contest writing time.
7. All participants (grade 7 to 9) in the same school MUST write at the same time.
8. DO NOT discuss or post any answers on social media.

GOOD LUCK!

Part A: **Multiple Choice:** Each correct answer is worth 4 points. Each unanswered question is worth 2 points to a maximum of 3 unanswered questions.
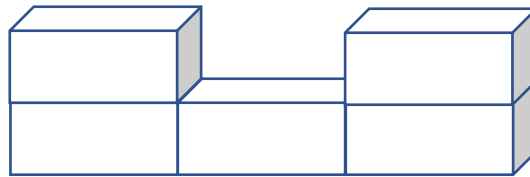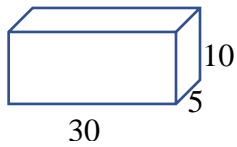
1. What is the measure of $\angle ABC$?
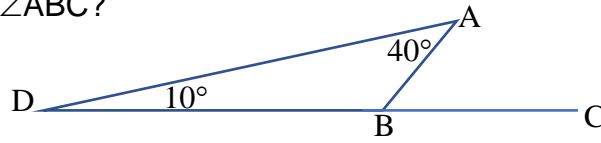
   A) 30° B) 40° C) 45° D) 50° E) 60°
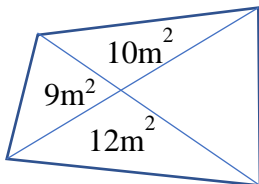
2. $4^{3n} = 16.$ $What\ is\ 4^{6n}$?

   A) 256 B) 32 C) 16 D) 8 E) 1

3. The solid on the left shows the measurement of one brick. Find the surface area of the solid on the right without the bottom. u^2= units square

   A) 3450 u^2 B) 3750 u^2 C) 4200 u^2 D) 3900 u^2 E) 2250 u^2

4. Find the area of the blank region rounded to tenths.

   A) 14.5 m² B) 11.5 m² C) 7.5 m² D) 13.3 m² E) 10.8 m²

5. If $\dfrac{9^{4x-1}}{27} = \dfrac{3^{2x+1}}{81^{0.5-x}}$, what is the value of x?

A) 2   B) 1.5   C) 3   D) – 1.5   E) – 0.5

6. $2x - 3(4y + 4) - ((3x - (4x - (3y - 4z)) - 4(2x - 5y + 6z))) = ax + by + cz + d.$
What is the value of a + b + c + d?

A) 16   B) 9   C) 3   D) – 9   E) – 8

7. How many integer solutions are there if $-20 \leq x < 10$ and $-30 < \dfrac{5x-4}{2} \leq 30$?

A) 24   B) 22   C) 23   D) 19   E) 21

8.   A blue marble weighs 100 grams, and a red marble weighs 500 g. Michelle weighs all her marbles and she discovers that the average weight of her marbles is 200 g. The number of blue marbles is how many times that of the number of red marbles?

9.   Find the rightmost three digits of $1 + 11 + 111 + 1111 + \cdots + \underbrace{11111}_{2019\ digits}$

10.   There are two whole numbers such that the square of their sum is 68 more than the square of their difference. What is the product of the two whole numbers?

11.   Find all two-digit numbers with the property that the number is three times the product of its digits.

12.   Given a sequence of 20 positive integers, it is known that the sum of any 3 consecutive terms in the sequence is even. Find the maximum number of odd integers that can exist in this sequence.

13. For some real positive number n, let $\lfloor n \rfloor$ be the greatest integer less than or equal to n. For example, $\lfloor \frac{1}{4} \rfloor = 0$, $\lfloor \frac{8}{7} \rfloor = 1$, $and \lfloor 3 \rfloor = 3$. Evaluate

$$\left\lfloor \frac{1}{5} \right\rfloor + \left\lfloor \frac{3}{5} \right\rfloor + \left\lfloor \frac{5}{5} \right\rfloor + \cdots + \left\lfloor \frac{2019}{5} \right\rfloor$$

Part C: Short Answer: Place the answer in the blank provided on the answer sheet. Each correct answer is worth 7 points.

14. The tens digit of a two-digit prime number is smaller than its units digit, and the number obtained by interchanging the two digits is also a prime number. How many such numbers are there?

15. Three boys play badminton. Two of them play in the first game. In each subsequent game, the waiting boy replaces the loser of the preceding game. When they stop, Caleb has played 10 games and Ryan 21 games. How many games has Evan played?

16. The students in a class are divided into groups of size m ≤ 5 to work on mathematics projects, and also into groups of size n ≤ 5 to work on nature projects. For each student, the pair (m, n) is different. At most how many students are in this class?

17. D, E and F are points on the sides BC, CA and AB, respectively, of triangle ABC. AD, BE and CF meet at G. If AG=GD, BG=2GE and CG=xGF, determine x.

18. Initially, there are one 1 and nine 0s. In each move, we can replace any two of the numbers by their average. What is the minimal value of the number obtained after nine moves?

19. A shop sells two kinds of items, hamburgers and hot dogs, each costs an integral number of dollars. Alice spends 43 dollars for 7 items. Michelle spends 42 dollars for 9 items. The number of hamburgers they buy differ by at least 2. Christopher spends 41 dollars in this shop. How many items does he buy?