Print ID # _____          School Name _____


Student Name _____(**Print** First, Last)  $\overline{100}$

## 2017 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.
7.  All participants (grade 7 to 9) in the same school MUST write at the same time.
8.  When done, carefully REMOVE and HAND IN this TOP page.  You may keep the contest.
9.  DO NOT discuss or post any answers on social media.

GOOD LUCK!

# Edmonton Junior High Math Contest 2017

**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. A 4-digit number uses each of the digits 3, 4, 5, and 6 exactly once. If the digits are placed randomly, what is the probability that the 4-digit number is a multiple of 6?

   A. $\dfrac{1}{6}$     B. $\dfrac{1}{3}$      C. $\dfrac{2}{3}$      D. $\dfrac{1}{2}$     E. $\dfrac{5}{6}$

2. Two analog clocks run at the correct rate of speed. Both clocks show the correct time when it is 9:45 p.m. However, as the hands on one clock run forward, the hands on the other clock run backward. When will both clocks next show the same time?

   A. 4:15 a.m.    B. 3:45 a.m.    C. 3:45 p.m.    D. 4:15 p.m.      E. 9:45 a.m.

3. Cellphone company Apple has no monthly fee but charges:

   - Local calls at $0.10/min, plus
   - Long Distance calls at $0.50/min, plus
   - Text Messages at $0.20/text beyond 75 texts, plus
   - Data at $10/GB past 3 GB.

   Cellphone company Banana charges $125/month for unlimited usage.

   Jaime's typical use per month is:

   - Local calls: 500 minutes, plus
   - Long Distance calls: 10 minutes, plus
   - Text Messages: 250
   - Data: 5 GB

   Based on Jaime's usage, which statement is true?

   A. Jaime saves less than $200/year using company Apple.
   B. Jaime saves more than $200/year using company Apple.
   C. Jaime saves less than $200/year using company Banana.
   D. Jaime saves more than $200/year using company Banana.
   E. Both companies would charge Jaime the same amount.

4. It will take me 2% of 8 hours to finish folding my laundry. It will take me 55% of 20 minutes to unload the dishwasher. Which task will take me longer to complete, and by how many more seconds?

   A. Folding laundry by 84 seconds.
   B. Folding laundry by 54 seconds.
   C. Unloading the dishwasher by 84 seconds.
   D. Unloading the dishwasher by 54 seconds.
   E. Both tasks take the same amount of time.

5. I started a game with an even number of points, and played 3 rounds. In the first round, I lost half of my points. In the second round, I won back twice the number of points that I had started the game with. I ended the third round with half the number of points that I had started that round with. I ended the game with 15 points. Which describes how the number of points I ended the game with compares to the number of points I started the game with?

    A. I ended the game with half the points that I started the game with.
    B. I ended the game with double the points that I started the game with.
    C. I ended the game with 3 more points than what I started the game with.
    D. I ended the game with 3 less points than what I started the game with.
    E. I ended the game with the same number of points that I started the game with.

6. Given that the formula for the Volume of a Sphere is: $\mathbf{V} = \left(\frac{4}{3}\right)\pi r^3$

    A cube has the same height as the diameter of a sphere. The Surface Area of the cube is 216 cm$^2$. Rounded to the nearest whole cubic centimetre, how much larger is the volume of the cube compared to the volume of the sphere?
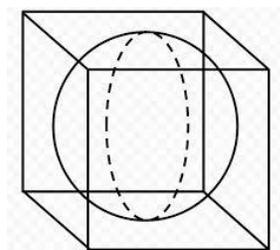
    A. 96     B.   103     C.   108     D.   127     E.   216

7. A package contains 4 chocolate, 3 vanilla and 3 lemon cupcakes. How many chocolate cupcakes, represented by x, must be added to the package so that it will contain 60% chocolate cupcakes?

    Which of the following equations could be used to solve this problem?

    A. $\dfrac{x-10}{x-4} = \dfrac{60}{100}$     B. $\dfrac{x+10}{x+4} = \dfrac{60}{100}$     C. $\dfrac{x}{x+10} = \dfrac{0.6\,x}{1}$

    D. $\dfrac{x+4}{x+10} = \dfrac{60}{100}$     E. $\dfrac{x}{0.6} = x + 10$

**Part B: Short Answer:** Place the answer in the blank provided on the answer sheet. Each correct answer is worth 5 points.

8. Each person in a room shook hands once with each other person in the room. If the total number of handshakes was less than 1000, then what is the most number of people that could have been in the room?

9. The sum of two rational numbers is 1. Amy add the larger number to the square of the smaller number. Beth add the smaller number to the square of the larger number. What is the difference of the two values?

10. Although Jen has no savings, she wants to earn enough money in 4 months to buy a puppy. On the first month, Jen earns half of the total cost. On the second month, Jen earns one-third of the amount she still needs. On the third month, she earns $80. After 3 months, she has earned 75% of the total cost of the puppy. How much money must Jen earn in the fourth month to have enough to buy the puppy?

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11. Xiang's age is 10 less than the sum of Yvonne's age and Zoe's age. The ratio of Xiang's age to Yvonne's age is 3:2. Zoe is 2 years older than Yvonne. What is the sum of the ages of the three people 4 years from now?

12. What is the sum of the interior areas, to the nearest square unit, of the letters used to spell the word "MATH"?
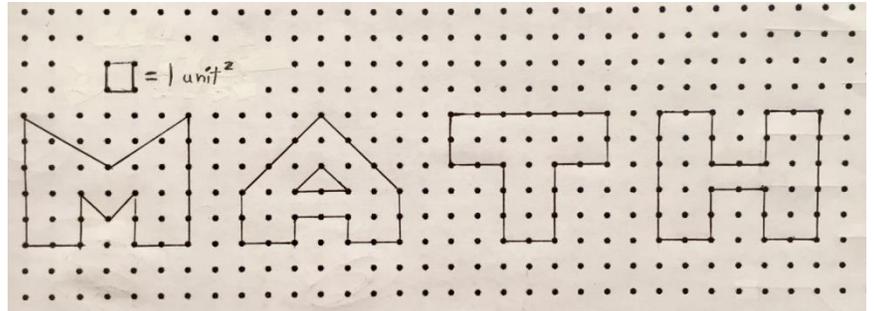


13. What is the area, in square centimeters, of an isosceles trapezoid, given the following clues?

- Its perimeter is 64 cm
- Each of the 2 congruent sides is 10 cm
- The difference in the lengths of the parallel sides is 12 cm

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

14. Mary divides by 5 each number from 1 to 2017, inclusive. She then adds together all the remainders she gets. Find the sum Mary obtains.

15. How many 4 digit palindromes are divisible by 7?

16. Nickels, dimes, and quarters are to be used to make exactly $1.00. At least one of each type of coin must be used. In how many different ways can this be done if an even number of coins must be used?

17. A girl and a boy play Rock, Paper, Scissors ten times, where Rock beats Scissors, Scissors beat Paper and Papers beat Rock. The boy uses Rock three times, Scissors six times and Paper once. The girl uses Rock twice, Scissors four times and Paper four times. None of the ten games was a tie. How many games has the boy won?

18. Of all the whole numbers N from 1 to 2017 inclusive, how many have the property that there exists a number M such that the sum of M and N is equal to the sum of the reciprocal of M and the reciprocal of N?

19. Find a positive integer whose ones digit is 5, and when it is multiplied by 4, the 5 becomes the first digit while all other digits shift one place to the right.