2011 Edmonton Junior High Math Contest

Multiple Choice		**Numeric Response**
(PRINT neatly using CAPITAL letters)		

Part A: (4 pts each)	Part B: (6 pts each)	Part C: (8 pts each)
1.	6.	11.
2.	7.	12.
3.	8.	13.
4.	9.	14.
5.	10.	15.

Instructions:

1. Grid paper, scrap paper, and non-programmable calculators **ARE** permitted. You may write on the booklet.

2. Programmable calculators, cell phones, and wireless devices **ARE NOT** allowed.

3. To avoid others from seeing your answers, **DON'T** print your answers **TOO LARGE**, and be sure your answers are **HIDDEN FROM VIEW** at all times.

4. Each **CORRECT ANSWER** in:
    -   Part A is worth 4 points,
    -   Part B is worth 6 points,
    -   Part C is worth 8 points.

5. Each **BLANK** in:
    -   Part A is worth 1 point,
    -   Part B is worth 2 points,
    -   Part C is worth 0 points.

6. Each **INCORRECT ANSWER** is worth 0 points.

7. You have 60 minutes of writing time.

8. When done, carefully **REMOVE** and **HAND IN** only this **COVER PAGE**.

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Part A: <u>Multiple Choice.</u> **Place the letter that corresponds to the correct answer on the blank provided. Each correct answer is worth 4 points. Each unanswered question is worth 1 point.**

1. The square root of half Mitchell's age in years is half the sum of the first 3 prime numbers. What is Mitchell's age in years?

    A) 9

    B) 10

    C) 18

    D) 25

    E) 50

2. A bag contains red, yellow, and green gumdrops. Of the total, $\frac{1}{4}$ are red, $\frac{1}{3}$ are yellow, and the remaining 70 gumdrops are green. How many gumdrops are in the bag?

    A) 120

    B) 168

    C) 192

    D) 204

    E) 210

3. Kendra has a basket containing 4 types of fruit. She has 3 times as many bananas as apples. There are 4 more pears than bananas, and 2 less lemons than apples. What is the least number of pieces of fruit that could be in Kendra's basket?

   A) 10

    B) 14

    C) 18

    D) 20

    E) 26

4. In the figure shown, at the right, the radius of each circle is 3 cm. The centres of the circles represent the vertices of a square. What is the area of the closed shaded region, to the nearest square centimetre?

A) 4

B) 6

C) 8

D) 16

E) 18
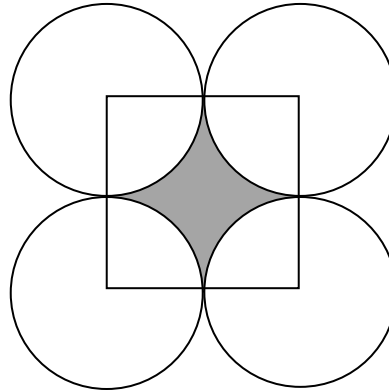
5. In the figure shown at the right, the length of segment AB = 16 cm and the length of segment CD = 6 cm. What is the radius of Circle C, to the nearest centimetre?

A) 8

B) 10

C) 14

D) 17

E) 20
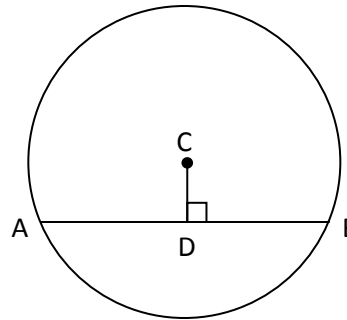
Part B: <u>Multiple Choice</u>. Place the letter that corresponds to the correct answer on the blank provided. Each correct answer is worth 6 points. Each unanswered question is worth 2 points.

6. What is the sum of the first 63 terms of the following sequence?

1, -2, 3, -4, 5, 1, -2, 3, -4, 5, 1, -2, 3, -4, 5, 1, -2, 3, -4, 5, ….

A) 34

B) 36

C) 37

D) 38

E) 40

7. The first 13 terms of a number pattern are shown below, what is the 15th term?

1, 1, 2, 2, 4, 6, 3, 9, 12, 4, 16, 20, 5, …

    A) 25

    B) 30

    C) 35

    D) 36

    E) 38

8. A large cube with an edge of 8 cm is made from the least possible number of centicubes. Although the object looks solid, it is hollow inside. How many centicubes are needed to make the object?

    A) 96

    B) 169

    C) 216

    D) 296

    E) 384

9. If (1, 2) and (-1, -2) are two vertices of a square, which of the following points could not be another vertex of the square?
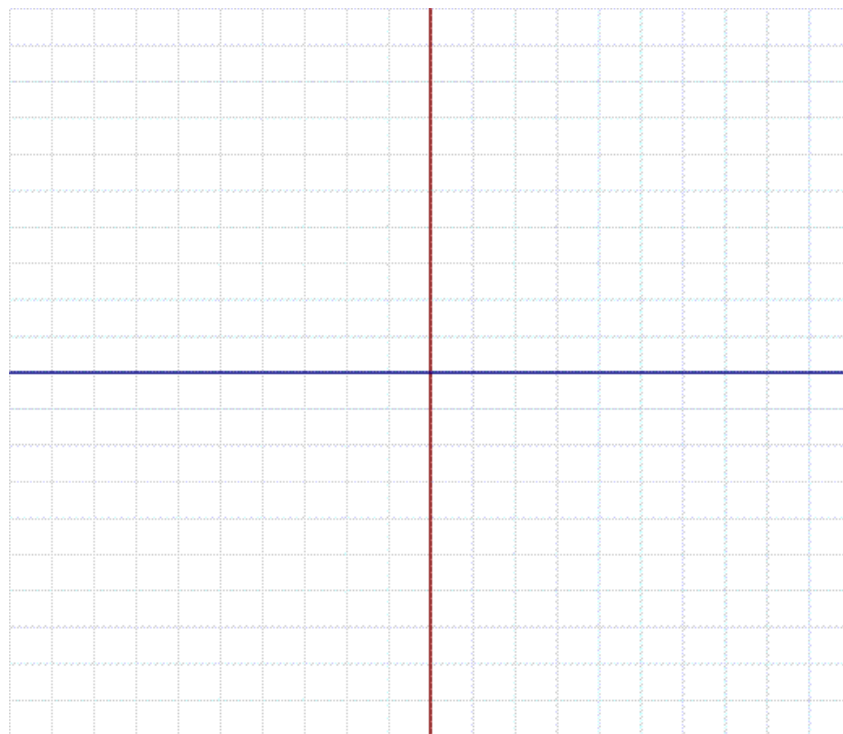
    A) (-2, 1)

    B) (2, -1)

    C) (3, -4)

    D) (4, -1)

    E) (5, 0)

10. Let ABCD be a quadrilateral with AB parallel to CD and CD = 2AB. Let E be a point on CD so that AE is parallel to BC.

Find the ratio of the areas of ADE to ABCD.

     A) 1 : 4

     B) 1 : 3

     C) 1: 2

     D) 2: 3

     E) 3: 4

Part C: <u>Numeric Response</u>. Place the correct answer on the blank provided. Each correct answer is worth 8 points. Each unanswered question is worth 0 points.

11. Find all natural numbers $n \geq 1$ for which $n(n-1)(n+1) + 3$ is prime.

12. The numbers between 1 and 2011 are written on a piece of paper. Logan circles the even numbers with red circles and Miranda circles the multiples of 5 with blue circles. How many numbers are circled with only one color?

13. The table below shows the integers from 1 to 25 in a 5 by 5 array. Choose five of the numbers, with one in each row and one in each column, such that the smallest of the five chosen numbers is as large as possible. What is the largest possible value for this number?

11	17	25	19	16
24	10	13	15	3
12	5	14	2	18
23	4	1	8	22
6	20	7	21	9

14. In the diagram below, triangle ABC has a right angle at A and AB = AC. A circle passing through A cuts AC at E, AB at F and CD at D, with AE = AF. If the measure of angle CAD is 17°, what is the measure of angle ACF?
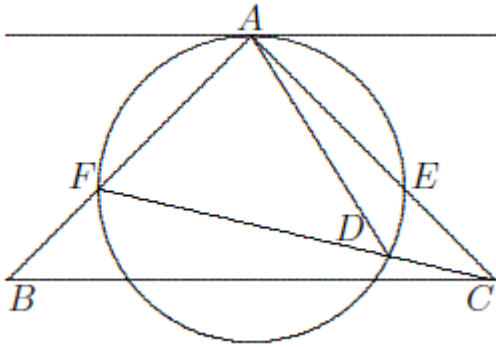
15. What is the smallest positive integer which is divisible by both 7 and 9, each digit is 7 or 9, and there is at least one 7 and at least one 9?