

2010 Edmonton Junior High Math Contest

Part I: Multiple Choice (PRINT neatly, use CAPITAL letters, 4 points each)

Part II: Numeric Response (PRINT small but legibly, 6 points each)

| | |
|----|-----|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |
| 9. | 10. |

| | |
|-----|-----|
| 11. | 12. |
| 13. | 14. |
| 15. | 16. |
| 17. | 18. |
| 19. | 20. |

| | |
|--|----------------|
| Part I: _____ x 4 + _____ x 2 = _____ (be sure blanks ≤ 3) | MARKER ONLY |
| Correct Blank | |
| Part II: _____ x 6 = _____ | |
| Correct | |
| Total = _____ (enter the total score above) | |

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. Don't write your answers too LARGE to avoid others seeing your answers. COVER your answers at all times.
4. All fractions must be proper and reduced to lowest terms.
5. Each correct answer is worth 4 points for Multiple Choice and 6 points for Numeric Response.
6. Each incorrect answer is worth 0 points.
7. Each unanswered question in Part I is worth 2 points up to a maximum of 6 points.
8. Unanswered questions in Part II are worth 0 points.
9. You have 90 minutes of writing time.
- 10. When done, carefully REMOVE and HAND IN only page 1.**

Multiple Choice Questions

1. The side lengths of a rectangle are whole numbers and the perimeter is 202 cm. What is the largest area possible?

- A) 1000 cm²
- B) 2050 cm²
- C) 2550 cm²
- D) 3050 cm²
- E) none of these

2. x is a positive number with the property that $x^2 + \frac{1}{x^2} = 23$. The value of $x + \frac{1}{x}$ is

- A) 5
- B) 7
- C) $\sqrt{23}$
- D) $\sqrt{46}$
- E) none of these

3. How many whole numbers, n , can be found so that $\frac{2}{7} < \frac{n}{11} < \frac{2}{3}$?

- A) 3
- B) 4
- C) 5
- D) 6
- E) none of these

4. If p , $p + 10$, and $p + 14$ are all prime numbers, how many possible values are there of p ?

- A) 0
- B) 1
- C) 2
- D) 3
- E) infinitely many

5. In how many ways can two A's, two B's and two C's be arranged in a row so that no two adjacent letters are the same?

- A) 120
- B) 90
- C) 60
- D) 45
- E) 30

6. Given: $3^x = 9^{y-2}$ and $2^{x-3} = 8^y$, find the value of xy .

- A) -126
- B) -60
- C) 0
- D) 60
- E) 126

7. If x represent the units digit in the product of the first 100 prime numbers, and y represents the sum of the units digits of the first 10 multiples of 3, find $x + y$.

- A) 5
- B) 15
- C) 18
- D) 45
- E) 48

8. Twenty-four teens, washed one-third of the cars lined up for a charity car wash in 4 h. Then more teens joined the car-washing team, and the remaining cars were washed in another 6 hours. How many teens joined the team?

- A) 4
- B) 8
- C) 16
- D) 32
- E) 64

9. Kristoff earned \$10.00 each day for a week shoveling walks. On the eighth day he earned \$1.75 more than his average earnings for all 8 days. How much did Kristoff make on the eighth day?

- A) \$11.00
- B) \$11.75
- C) \$12.00
- D) \$13.75
- E) \$15.00

10. $\frac{2}{f}$ and $\frac{5}{2f}$ represent positive fractions. Which expression represents the sum of the two fractions that are evenly spaced between $\frac{2}{f}$ and $\frac{5}{2f}$?

A) $\frac{9}{2f}$

B) $\frac{10}{f}$

C) $\frac{1}{6f}$

D) $\frac{55}{12f}$

E) $\frac{25}{6f}$

Numeric Response (record answers on page 1)

11. ABCD is a trapezoid, with side AB parallel to side CD. The sides: AB, BC and DA are equal and are of length 2 cm. Side CD has length of 4 cm. The measure of angle ADC is _____°.

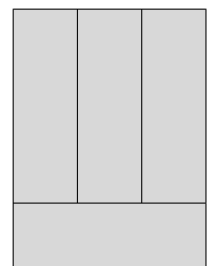
12. The product of the digits of the number 176 is 42. How many other three-digit numbers have 42 as the product of their digits?

13. Alyssa said to Bryan, "If you give me half of your money, I will have just enough to buy that horse." Bryan replied, "If instead you give me two-thirds of your money, I will have just enough to buy that same horse." Neither gave, and instead spent all their money buying pigs, each of which cost the same. If Alyssa bought 30 pigs, how many did Bryan buy?

14. The length and area of a rectangle can be expressed as x^2y and x^3y^2 , respectively, where x and y are natural numbers. If the area is 1323 m^2 , what is the perimeter of the rectangle?

15. The sum of three positive integers is 9. What is the least possible product of their reciprocals? Express your answer to the nearest thousandth.

16. A large rectangular field is subdivided into 4 congruent rectangular fields as shown at the right. The area of the large rectangular field is 3468 m^2 . Find the area of a square field that has the same perimeter as the large field before it was subdivided. Express your answer to the nearest whole square metre.



17. The height of a cone is increased by 10% and the radius is decreased by 10%. By what percent, expressed to the nearest tenth of a percent, will the volume of the cone change? (Volume of cone = $\frac{\pi R^2 H}{3}$, where R is the radius and H is the height)

18. If you randomly select 3 vertices of a regular hexagon, and then connect them, what is the probability that a right triangle will be formed? Express your answer as a decimal, to the nearest hundredth.

19. Kylee is a cheerleader and has a drawer that contains four colours of poms. Ninety are gold, 70 are green, 50 are blue, and 40 are red. She randomly pulls out poms, one at a time, without looking at the colours. What is the fewest number of poms that Kylee must remove to be certain that she has at least 10 pairs of matching poms?

20. Travis left home, traveled 12 km west to the grocery store, then 6 km south to the post office, then 2 km west to the bank, then x km north to the library. The shortest distance from the library to Travis's home is 15 km. What is the farthest distance that the library can be from the bank? Express your answer to the nearest tenth of a kilometer.