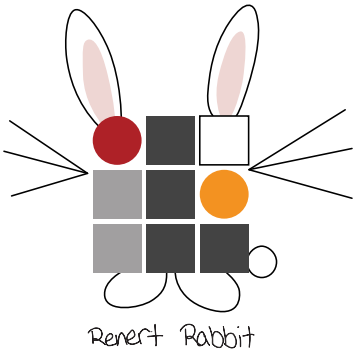
Renert Rabbit
Gr 6
February 7, 2024

Name (Print): _____



Special thank you to Simon Gidrewicz, Armin Jessa, Landry Moroz, and Marshall Turner for their help in designing questions!

Instructions:

1. Do not open this booklet until you are told by your teacher to begin.
2. Materials: pencil, paper — no other materials. NO calculators!
3. You will have exactly **60 minutes** to work on the contest.
4. This form has 9 questions in Part A, 9 questions in Part B, and 5 questions in Part C.
5. Parts A and B of this contest are multiple choice. Each of the questions in these parts is followed by five possible answers marked A, B, C, D, and E. Only one of these is correct. After making your choice, fill in the appropriate circle on the response form.
6. The correct answer to each question in Part C is an integer from 0 to 99, inclusive. Fill in your number using the appropriate circles on the response form. A one-digit answer (such as "4") must be coded with a leading zero ("04").
7. Scoring:
   - Each correct answer is worth:
     - 4 points in Part A,
     - 5 points in Part B,
     - 6 points in Part C.
   - Each unanswered question is worth 2 points.
   - Incorrect answers are worth 0 points.

Part A (4 points each)

1. Consider the numbers 2.46, 2.44, 2.062, 3.011, and 2.5. Which of these is the 2nd largest?

   (A) 2.46 (B) 2.44 (C) 2.062 (D) 3.011 (E) 2.5

2. What is the value of $1 - 2 + (-3) - (-4) + 5 - 6 + (-7) - (-8)$?

   (A) -4 (B) -2 (C) 0 (D) 2 (E) 4

3. Which of the following is the largest?

   (A) $2^0 + 2^4$ (B) $2^0 \times 2 + 4$ (C) $2 + 0^2 + 4$ (D) $(2 + 0)^2 + 4$ (E) $2^0 \times 2^4$

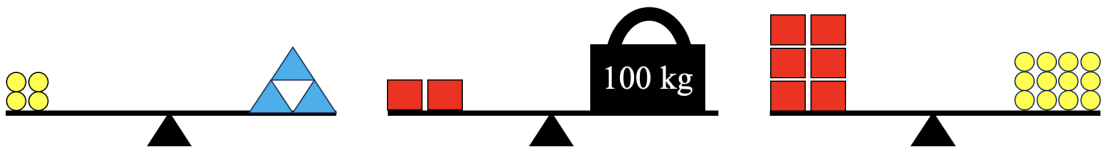
4. What is the smallest prime number greater than 89?

   (A) 91 (B) 93 (C) 97 (D) 101 (E) 103

5. The six-digit number 56A9B2 is divisible by 3. Which of the following could be the values of A and B?

   (A) 7, 4 (B) 3, 6 (C) 5, 1 (D) 1, 9 (E) 0, 9

6. Given the following scales, what is the mass of one circle plus one square plus one triangle altogether?



   (A) 25 kg (B) 300 kg (C) 108 $\frac{1}{3}$ kg (D) 50 kg (E) 33 $\frac{1}{3}$ kg

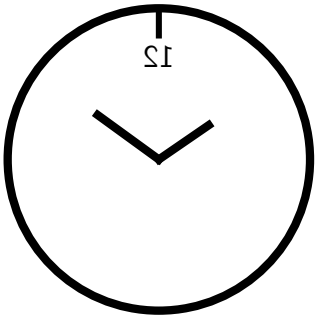
7. The Renert Rabbit replaced every letter of the alphabet with a new symbol to make a secret code. He rewrote the names of his friends: aaron, vlad, adam, joyce, ryan, doina, and vince. He then forgot who was assigned which code, but he knew that the codes were: 262%, 18&43, 7@?43, 68@?2, 22#8?, #&2?, and 7$26. Which of the following codes could be "renert"?

   (A) #3@3#) (B) 68286((C) 73?37* (D) #3?3#0 (E) 78@87+

8. Audrey, Aydin, Kayley, and Jayen are siblings. The sum of their ages is 47. If Audrey is currently 14 years old, how old will she be when the sum of their ages is 75?

   (A) 61 (B) 25 (C) 21 (D) 56 (E) 89

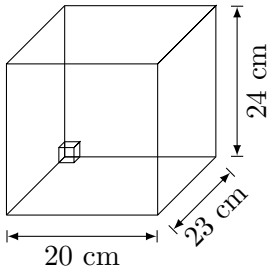
9. Most of the numbers disappeared from this clock that you are seeing in the mirror. Can you estimate the time it shows?



   (A) 2:48 (B) 5:23 (C) 6:59 (D) 8:19 (E) 10:09

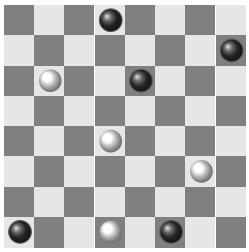
Part B (5 points each)

10. How many 2 cm × 2 cm × 2 cm blocks can fit inside a 20 cm × 23 cm × 24 cm box?

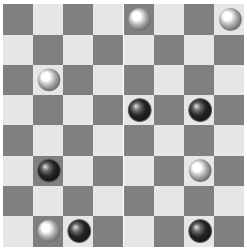


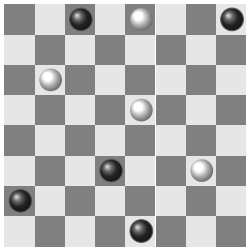
    (A) 1320 (B) 1380 (C) 11040 (D) 10560 (E) 2760

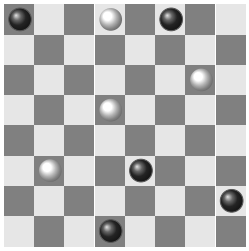
11. Renert Rabbit put 5 black tokens and 4 white tokens on her checkerboard.

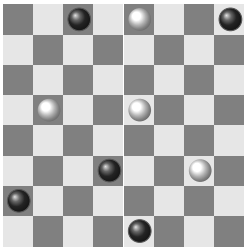


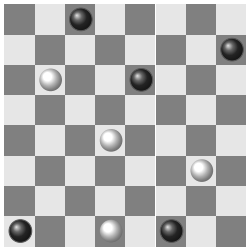
She decides to move the pieces so that the resulting board has its pieces mirrored both horizontally and vertically from the original. What does the board look like now?

(A) 

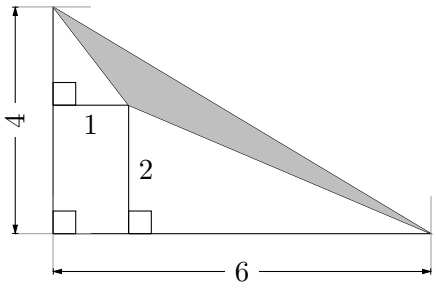
(C) 

(E) 

(B) 

(D) 

12. How big is the shaded area?

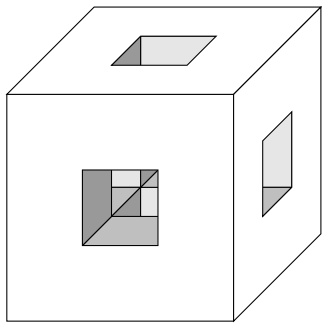


(A) 3 (B) 4 (C) 5 (D) 6 (E) 7

13. What is the last digit of $20^{20} + 24^{24}$?

(A) 0 (B) 2 (C) 4 (D) 6 (E) 8

14. A $3 \times 3 \times 3$ cube has three 1×1 square-shaped holes cut into the center of each face, through the entire cube. What is the volume of the remaining solid?



(A) 18 (B) 19 (C) 20 (D) 21 (E) 22

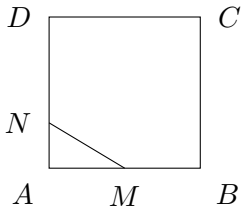
15. Ms. Marina brought 8 purple candies, 7 red candies, and 10 orange candies to give students in her math class. It turned out that some of the candies melted. Among purple and red candies a total of 10 melted. Among orange and purple candies a total of 11 melted. Among red and orange candies a total of 9 melted. How many red candies did not melt?

(A) 1 (B) 3 (C) 4 (D) 6 (E) 7

16. Consider the fractions $\frac{6}{407}, \frac{10}{671}, \frac{15}{1012}$. Which of the following is correct?

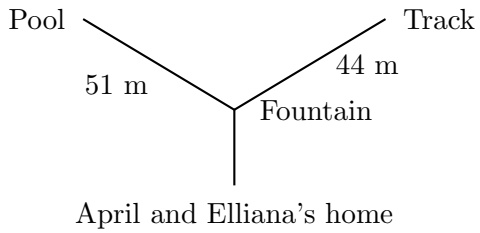
(A) $\frac{6}{407} < \frac{10}{671} < \frac{15}{1012}$
(B) $\frac{6}{407} < \frac{15}{1012} < \frac{10}{671}$
(C) $\frac{10}{671} < \frac{15}{1012} < \frac{6}{407}$
(D) $\frac{15}{1012} < \frac{6}{407} < \frac{10}{671}$
(E) $\frac{15}{1012} < \frac{10}{671} < \frac{6}{407}$

17. In a square $ABCD$, point M is the midpoint of side AB, and point N is on the side AD. If the ratio $AN : ND$ is $2 : 3$, what is the ratio of the area of AMN to the area of $MBCDN$?



(A) 2 : 3 (B) 3 : 2 (C) 1 : 9 (D) 9 : 1 (E) 1 : 11

18. April and Elliana are at home. April runs to the fountain and then to the pool, which takes her 37 seconds in total running at 3 m/s. Elliana runs to the fountain and then to the track at a speed of 4 m/s. How many seconds will it take Elliana to run to the track from home?



(A) 25 (B) 26 (C) 27 (D) 28 (E) 29

Part C (6 points each)

19. Farah writes a list of numbers where each number (after the 2nd number) is the last digit of the product of the previous two numbers. If the first six numbers she writes are 2, 3, 6, 8, 8, 4. What will be the 2024th number on her list?

20. The sum of 7 consecutive odd numbers is 259. What is the third smallest of these numbers?

21. Renert Rabbit thinks of 4 numbers where the mean, median, and range are all equal to 2024. What is the sum of the digits of the largest number she thinks of?

22. In the town of Rabbiton, the only sports that rabbits may play are basketball, soccer, or rugby. Exactly 1000 rabbits play each of the three sports. For each sport, exactly 400 rabbits play that sport and not the other two. Exactly 300 rabbits play all three sports, and 500 do not play any of the sports. If N is the number of rabbits in Rabbiton, what is the sum of the digits of N?

23. A magic rectangle is a rectangle with an area that is a **multiple** of 60 and integer side lengths. How many magic rectangles have a perimeter smaller than 70? (Two rectangles are considered the same if one can be rotated to match the other.)