WinMaC 2016

Dash Round

Name: ______________________________ Score: __________ / 40

PLEASE DO NOT FILL IN ABOVE! (the SCORE blank)

Grade: ______________________ Team: ______________________

This is a round consisting of 25 problems to be done in 25 minutes. Problems are in roughly ascending difficulty. The first 10 problems will be worth 1 point each while the last 15 will be worth 2 points apiece. Any figures or diagrams in the test may not be to scale.

No aids are permitted aside from pencils, pens, and provided scratch paper. In particular, no calculators or other computers are permitted. Communication with other people will result in a zero.

Record your answers in the box corresponding to the correct problem. Only answers printed in the boxes below will be scored.

Your Answers

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

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1. Compute $42 - 23 + 38 - (-12)$.

2. If $L + I + S + T + E + N = 2016$, then compute $S + I + L + E + N + T$.

3. Let $a \triangle b = \frac{a}{3} + b^2$. Compute $(6 + 3)(6 \triangle 3)$.

4. Solve for x: $3(x + 7) = 5x - 2(2x - 14)$.

5. List two solution pairs (a, b) to the equation $2a + 2b = ab$.

6. A number is considered *good* if the number is divisible by the number of factors it has. How many good one-digit positive numbers are there?

7. If it takes Jack 10 minutes to type a page while it takes Jill 8 minutes to type a page, then how long will it take them to type a page working together? Round your answer to the nearest minute.

8. Find the sum of the first 60 odd numbers.

9. In a line stood five friends: Michael, Robert, Jason, Will, and Brandon. Will and Jason weren't first or last. Michael stood before Will. Brandon wasnt last and was exactly 2 spots behind Will. Who was third?

10. Brandon has 5 red marbles and 3 yellow marbles in a container. If he takes 2 marbles out of the container without replacement, what is the probability that both marbles are yellow?

11. If a, b, c, d, e are consecutive whole numbers for $a < b < c < d < e$ and $b, c, d, e, 2a$ are consecutive whole numbers for $b < c < d < e < 2a$, then compute the value of e.

12. Munchlax sees an apple in the distance. To retrieve it, he walks 8 feet north and 15 feet east. After he is finish eating it, he realizes that there was a faster way. How many feet less would he need to walk if he walked straight towards it?

13. A moose and a mouse both are at McCall Middle School. The moose then wanders east at 12 miles per hour, planning to eat a shark in the Atlantic Ocean. The mouse scampers north at 9 miles per hour, planning to scare a lobster in Maine. In two hours, how far apart are the moose and the mouse?

14. What is the value of y in the magic square below, where each of the squares is filled with a distinct number 1-9? All columns, rows, and diagonals add up to the same value.

	3	4
1	5	
	y	2

15. What is the remainder when 2^{20} is divided by 5?

16. What is the difference of the 2 smallest primes greater than 2000?

17. If you roll a fair 6-sided die numbered 1-6 twice, then what is the probability that the sum of the numbers on the top faces will add up to be greater than 5?

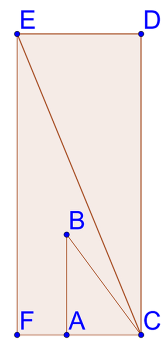
18. How many three digit numbers with a digit sum of 15 is divisible of 5?

19. Jason stood in a restaurant to order lunch. There are 5 different choices for meat, 3 different choices of drinks, 4 different choices of salads, and 2 different choices of desserts. If one of the drinks, Mountain Dew, doesnt go well with 3 types of salad, how many combinations of lunch can Jason have if he orders one of each type of food (meat, drinks, salads, desserts)?

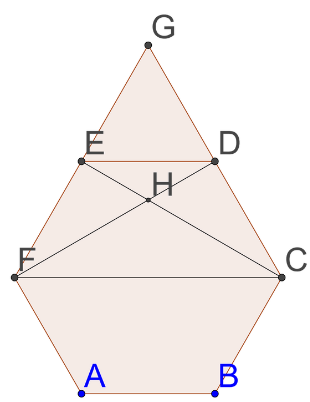
20. Jeffrey has 60 liters of a beverage that is 60% coffee, how many liters of water can be added this beverage to make it 40% coffee?

21. If $x^x = 2x$, find the integer solution.

22. $EFCD$ is a rectangle with area 60. Points A and B are constructed such that AB is perpendicular to AC with B inside the rectangle, and $AC = \frac{DC}{4}$. Given that ED, DC, EC, AB, BC, AC all have integer lengths, then what is the perimeter of $ABCEF$?



23. $ABCDEF$ is a regular hexagon, with triangle DEG on top of it. Let EC and DF meet at H. Given that the area of $ABCHF$ is $39\sqrt{3}$, then find the area of $EHDG$.



24. Evaluate $\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \cdots + \frac{1}{10302}$.

25. If $5 \cdot 41 \cdot 16 \cdot 2$ can be written in the form $a^b - 1$ for integers (a, b), then how many ordered pairs of (a, b) exist?