WinMaC 2016

Theme Round

Name: _____ Score: _____ / 60

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

Grade: _____ Team: _____

This is a round consisting of 15 problems that is to be done in 45 minutes. The problems are split into 3 themes, which are in ascending difficulty. The problems within each theme are also in ascending difficulty. For example, problem 5 in category 3 is significantly harder than problem 5 in category 1. The problems are each worth 4 points.

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 is not permitted.

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

Your Answers

McCall	Sports	Pokemon
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.

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McCall

Half of a test is your reading comprehension skills, once you can read, you have solved 51% of the test. 1/2 equals 51% - Brandon Zhang
Silly mistakes kill you. -Robert Zhang
"don't mess up" -Max Lu

1. Mr. Farelli wrote a math code that will add up all the distinct prime factors the input has. If he puts in 36, what will be the output of the code?

2. On the 8th grade D.C. trip, there were 8 buses and 464 students. What is the average amount of students on each bus?

3. It takes PW (Problem Writer) Jason 12 minutes to write a problem, and 3 minutes to send it to McCall from Chenery. It takes PW Brandon 10 minutes to write a problem, and 14 minutes to send it from Winchester High School to McCall. It takes PW Robert 30 minutes to write a problem. Working together, how many problems can Jason, Brandon, and Robert write in 2 hours?

4. Jeff the rebel likes to bring his phone to class, and he also often forgets to do his homework. There is a 70% chance he is going to bring in his phone and a 80% chance he is going to forget to do his homework. If not doing your homework or bringing a phone in will get you a detention, what is the probability that Jeff wont get a detention?

5. Robert lives 17 kilometers away from McCall Middle School and 17 kilometers from Boston. If it is known that the area of the triangle created by connecting Mccall Middle School, Boston, and Roberts house is 120 square kilometers, and the distance from Boston to Mccall Middle School is more than 20 kilometers, then what is the distance between Boston and Mccall Middle School, in kilometers?

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Sports

I could talk food all day. I love good food. -Tom Brady
"We're going to turn this team 360 degrees," -Jason Kidd
We hate the Yankees -All of Boston

1. Jack ran around his 700 meter track a certain number of times, and then ran an extra 200 meters. Jill was running around her 900 meter track, and ran an extra 700 meters after. If they ran the same distance, what is the minimum distance, in meters, that they each ran?

2. Todd the turtle always leaves his house at 7:00 A.M. to jog to school in the morning. On the first day, he walks at a speed of 5 fpm(feet per minute) and he is 5 minutes late. So on the second day, he jogs at a speed of 8 fpm, and he is 4 minutes early. When does school start for him?

3. At the sport stadium, 5 types of sandwiches are sold. Ham sandwiches cost \$3. Rice sandwiches cost \$4. Chicken sandwiches cost \$5. Noodle sandwiches cost \$6. Fillet-o-fish sandwiches cost \$7. How many different combinations of sandwiches can Kaiwen buy if he is to spend exactly \$14?

4. At McCall, a gym locker combo is made up of 3 different numbers ranging from 0-44 and no two lockers have identical combos. McCall has 1892 lockers and each year they change every lockers combo to a combo that has never been used before. If 2016 is the first year McCall introduced this system, after which year will McCall have exhausted all possible combos?

5. There are 7 people in the BFL (Backyard Football League). If everyone has a 50% chance of showing up and there needs to be at least 4 people to play a game, what is the probability that the BFL can play a game?

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Pokemon

Gotta solve 'em all!
Didnt you absol-utely enjoy these problems? Mewtwo! (idea from ImpossibleCube on AoPS)
Absol senses coming disasters and appears before people only to warn them of impending danger. -Absols Pokedex Entry

1. Bulbasaur thought of a positive number x such that the remainder when x divided by 7 is one more than the remainder when $5x$ is divided by 7. What is the smallest possible value of x?

2. If there were 7 indistinct pidgeots and there were 3 distinct computers, how many ways can the 7 pidgeots can go into the 3 computers? A computer can be empty.

3. A Pokemon card is in the shape of a 6 inch by 3 inch rectangle. Brandon was bored so he labels the 4 corners of the card A, B, C, D in clockwise order and decides to fold the card such that point B coincides with point D, AB is the shorter side, and AD. Afterwards, he decides to unfold the card such that there is a visible crease with endpoints E and F on AD and BC respectively. If the crease EF has no width, find the length of crease EF in inches.

4. A minimally small Mewtwo is in the center of a 1 by 1 square room bound by a forcefield. Two adjacent vertices of the square are colored red, and their midpoint is colored blue. Mewtwo is confused, so he sends an minimally small energy ball at the midpoint of the section connecting the blue point to a red point. The ball continues to bounce off of walls, changing course only when hitting a wall, and never stops until it hits Mewtwo or a vertex of the square. How far does the ball travel? (Minimally small means the size of a geometric point)

5. During each hour in a 6 hour school day, Jason the Snorlax does exactly one of the following activities: eat, sleep, or sit on another Pokemon. Suppose Jason considers an order of doing his activities *unhealthy* if at any point during the 6 hour day he eats in two consecutive hours. In how many ways can Jason go about his 6 hour period today, such that the order is unhealthy?