WinMaC 2017

Theme Round

Name: _____ Score: _____ / 45

Grade: _____ Team: _____

This is a round consisting of **9 problems** that is to be done in **35 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 **3** in category **3** is significantly harder than problem **3** in category **1.** The problems are each worth **5 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

Football	Todd the Turtle	Chess
1.	4.	7.
2.	5.	8.
3.	6.	9.

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BFL

1. In five BFL (Backyard Football League) games, the average length of the game was 122 minutes. If the first four games of the BFL lasted 121, 112, 130, and 129 minutes, how long was the last game?

2. Max, Robert, and Jon are playing football in the BFL. Max and Jon are throwing the ball and Robert is trying to catch the ball. It is known Robert always catches 75% of the balls thrown to him by Max and only 35% of the balls thrown by Jon, who is bad. If Max throws 36 passes to Robert and Jon throws 40 passes to Robert, how many more balls will Robert catch from Max than from Jon?

3. After trying out in the BFL, Todd the Turtle signed a contract with the Turtleville Ninjas. The contract included a signing bonus, which was given right after he signed the contract, along with a constant annual salary. If Todd signed for 5 years, and he earned 60 million dollars, what was the signing bonus in millions if he earned half of all the money after his second year?

Theme Round

Todd the Turtle

1. Todd the Turtle took two pictures of a mountain with one shot taken 700 meters closer than the other. He ended up with two images where the mountain in one is 9 times larger in area than the other. Assuming he took the pictures from the same angle both times, how far away was Todd the Turtle in his far away shot?

2. Todd the Turtle races Ron the Rabbit in a race. Todd the Turtle goes 3 mph and Ron the Rabbit goes 8 mph, but they raced in mud, where Todd is used to, but Ron the rabbit is only a third as fast of his original speed. If the race is 10 miles, how many minutes will Todd beat Ron to the finish line?

3. After beating Ron the Rabbit in question 2, Todd the Turtle is invited to go to the TFL(Turtle Football League). His score for 10-yard dash, vertical hops and 4-stone drill were all prime integers. If the sum of his three scores was 22, his 4-stone drill score was 13 and his vertical hops was the lowest, what was his score for the 10-yard dash?

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Theme Round

Chess

1. Brandon decides to play "Get Rich" with Robert where there are 27 pawns in the pile and the players take turns taking 1, 2, 3, or 4 pawns from the pile. Whoever takes the last pawn from the pile wins. If Brandon goes first, what is the minimum number of turns the game will last? One turn = One player taking pawns from the pile.

2. Kevin loves to play chess, so he joins a tournament. Every contestant at the tournament has to participate in 3 games no matter if they win or lose the previous ones. The first round, he has to play Robert. The second round, he has to play Cynthia. The third round, he has to play Will. If the probability that he will win against Robert is $\frac{9}{10}$, the probability he will win against Cynthia is $\frac{1}{2}$, and the probability that he will win against Will is $\frac{1}{3}$, what is the probability that he will only win exactly one of the 3 games?

3. On a 16×16 chess board, 2 out of the first n squares for each row (but not necessarily each column) are randomly chosen and painted white. All of the remaining squares in that row are painted black. It is guaranteed that the board contains at least one rectangle with horizontal and vertical sides that has all white squares for its 4 corners. What is the maximum possible value of n?