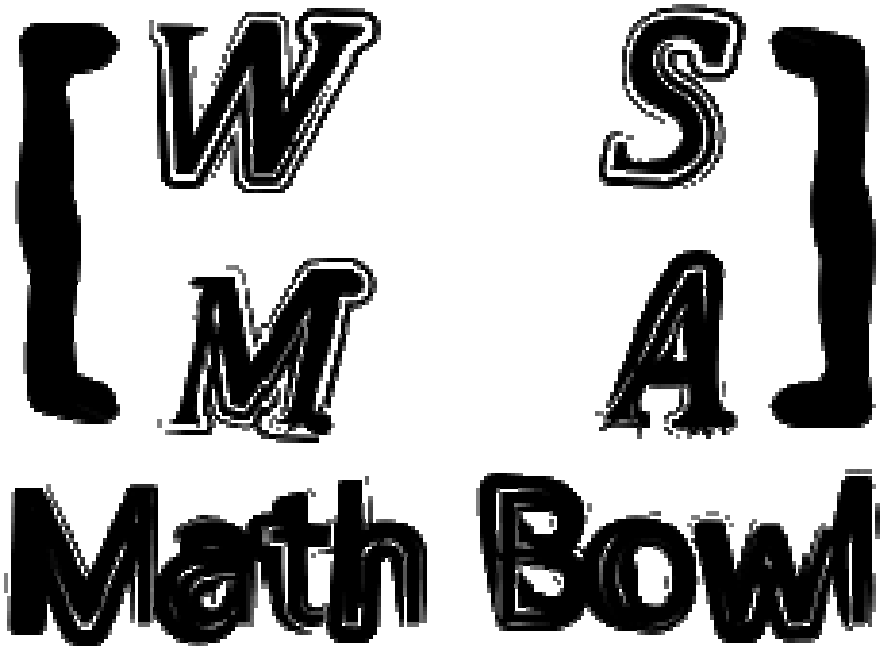

Elimination Round 2

2nd Annual WSMA Math Bowl

April 28, 2012

Problem 1

Sarah and Susan are playing a game. Each girl has a 1/4 chance of winning during each round. If neither girl wins, they play another round. If Sarah goes first, what is the probability that she ultimately wins?

Problem 2

Daniel has 3 different Taylor Swift songs, 1 Straight No Chaser song, and 4 different Hans Zimmer songs on his playlist. What is the probability that, when he shuffles this playlist, the Taylor Swift songs will end up together?

Problem 3

Bolun will leave the lab at a random time between 6 and 7 p.m. It takes him 15 minutes to get to his destination, walking outside. At some time between 6 and 7 p.m., it will start pouring for 15 minutes. What is the probability that Bolun will not get rained on?

Problem 4

Honk the penguin stands on Vertex A of regular pentagon ABCDE. Every hour on the hour from 11 a.m. to 5 p.m. he randomly chooses an adjacent vertex and moves to it. If Honk does not move after reaching Vertex C, what is the probability that he is standing on Vertex C at 5:28 p.m.?

Problem 5

At 7 p.m., Brian realizes he needs to prepare a presentation for 8 a.m. the next day. His productivity is currently 90% and it decreases to 75% after 10 p.m. and it decreases again to 50% after 3 a.m. If he starts working right away and finishes at 8 a.m., how many hours would he have saved by not procrastinating and working at 100% productivity? Express your answer as a decimal.

Problem 6

Sophia has an 18 oz. jar of peanut butter. If uses 0.75 oz on her breakfast bagel daily and eats one 0.5 oz scoop every other day starting with the first day, how much will she have left before breakfast on the 16th day?

Problem 7

Hansen's dinner was a slice of BBQ chicken pizza and three garlic knots, and cost $4.75. Jin had a slice of Grandma's pizza and five garlic knots for $3.50, and Sophia had a slice of Grandma's pizza and two garlic knots for $2.75. How much do two slices of BBQ chicken pizza, one slice of Grandma's pizza, and seven garlic knots cost?

Problem 8

How many more ways are there to try three flavors out of 50 at Ralph's Italian Ices than at Baskin Robbins, where there are (theoretically) 31 flavors?

Problem 9

Hansen is making honey milk tea. He first makes a 12 oz. cup of tea with no milk, then mixes 8 oz. of tea with 10 oz. of milk. How many times more honey would Hansen get if he added the honey in the 18 oz. cup than if he had added it in the 12 oz. cup? Assume honey takes up a negligible volume.

Problem 10

If Kevin starts working on his 18-page Siemens paper on 23 September, writes at the rate of 1 page every 2 hours, carefully revises each page at a rate of 40 minutes per page, and takes an additional three hours to add supplemental materials, how many hours per day must he work to finish on 2 October? Express your answer as a decimal.

Problem 11

Susan has a farm with turtles and penguins. If there are 90 legs and 28 heads, how many turtles are there?

Problem 12

A cylindrical muffin is 2 inches tall and 4 inches in diameter and costs $2.00. If its height decreases in half and the diameter increases by 1 inch, but its price remains the same, how much extra revenue per muffin is the greedy cafeteria making, assuming that a muffin costs the same the same amount to make per unit volume? Express your answer to the nearest cent.