Montlake Math Challenge
Montlake Elementary School
October 18, 2007

Instructions: In groups, try to answer as many of these questions as you can.

Question 1: You have two bottles. One of them holds three gallons of water, and the other holds five gallons of water. There are no markings on the bottles. Can you measure exactly four gallons of water?

Question 2: You have a bag that contains 24 pounds of pennies and a balance scale. (A balance scale has two pans, and if you put some nails in each of the pans, the scale will tilt to whichever side is heavier.) Is it possible to measure exactly nine pounds of pennies using only the scale?

Question 3: Draw nine dots in three straight rows with three dots each. Without picking up your pencil, draw four straight lines that connect all nine dots.

Question 4: Three very smart men are standing in a line, and all of them are facing the same direction. The Mad Hatter has three blue hats and two red hats and he randomly puts one hat on each man's head. The men knew that the Mad Hatter started with three blue hats and two red hats, but they do not know which two hats were left over. The man in the back of the line can see the hats of the two men in front of him, but he cannot see his own hat. The second man in line can see the hat of the man in front of him, but he cannot see his own hat or the hat of the man behind him. The man in front of the line cannot see any hats.

First, the man in the back of the line was asked if he could determine what color hat he was wearing, and he said he could not. Next, the second man in line was asked if he could determine what color hat he was wearing, and he also said he could not. Finally, the man in the front of the line, who had heard what the last two men had said, said that he knew what color hat he was wearing. What color was it and how did he know?

Question 5: Three men are sitting in a circle, all facing one another. Once again, the Mad Hatter has three blue hats and two red hats. The Mad Hatter shows the men the hats and then blindfolds them. He randomly puts one hat on each man's head, and takes the last two hats out of the room. Then men are told that the first one who can identify the color of his own hat will win one million dollars, but if a man guesses the wrong color hat, he will have to pay one million dollars. The blindfolds are then removed, and the men sit, staring at one another. Finally, one of the men exclaims "I know what color my hat is!" What color was it, and how did he know?