WSMA Math Bowl- March 2 2013

Total Points Earned:

/25

Answer Sheet: Creativity Round

Problem 1

Since this is a conditional probability question, we must approach this as dividing the condition and the event. In other words, we will find the probability that Evan has the flu GIVEN that he tests positive

Condition (given): Evan tests positive. ->90%

Event: Evan has the flu. ->5%

The probability that Evan has the flu and tests positive = (5%)(90%) = 0.045 -> 2 points

If Evan tests positive, the probability of the condition = probability that Evan has the flu and tests positive + Evan does not have the flu and tests positive = 0.045 + (95%)(10%) = 0.14 -> 2 points

Thus, the probability that Evan has the flu and tests positive = $^{0.045}/_{0.14} = {}^{9}/_{28}$ -> 1 point

(For official use) Question 1 – Total Points Earned:	**/5**

Problem 2

Expected value of points when eliminating 2 answers choices: $1 \times \frac{1}{3} - \frac{1}{4} \times \frac{2}{3} = \frac{1}{6}$ -> 2 points

Expected value of points when eliminating 1 answer choice: $1 \times \frac{1}{4} - \frac{1}{4} \times \frac{3}{4} = \frac{1}{16}$ -> 2 points

Difference in expected value: $\frac{1}{6} - \frac{1}{16} = \frac{5}{48}$ -> 1 point

(For official use) Question 2 – Total Points Earned:	**/5**

Problem 3

1. Move the blue box on the bottom right one step to the right to eliminate all the boxes except the three blue boxes on the top. -> 2points (must include at least one diagram of the result)
2. Move the blue box on the top right one step to the left to eliminate the remaining 3 boxes. -> 2points (must include at least one diagram of the result)
3. Drawing 3 or more diagrams->1 point

(For official use) Question 3 – Total Points Earned:	/5

Problem 4

To go from point P to point Q, there are $\binom{5}{2}$ = 10 ways. ->2 points

(listing is also an option: AB, AE, BC, BA, CD, CB, DE, DC, EA, ED)

From Q to point P, we must choose 2 points out of 3.

However, since only one of them is connected to two other points, there are 4 ways to get from point Q to point P.

Thus, total ways = $10\times 4 = 40$.

(For official use) Question 4 – Total Points Earned:	/5

Problem 5

Let's assume that Redmond and Skyline are both guilty.

This means that the rest of the schools, Newport, Interlake, and Issaquah are all innocent.

However, the third given statement states that if Issaquah is innocent, Skyline is also innocent, which is a contradiction.

Therefore, Redmond and Skyline is both innocent. ->2 points

Using a contrapositive statement of the 3rd given statement, if Interlake is guilty, Newport is also guilty. This means that Issaquah is innocent, which fits the 4th statement stating that Skyline is also innocent. ->2points

Thus, Newport and Interlake are the 2 guilty schools. ->1 point

(For official use) Question 5 – Total Points Earned:	**/5**

