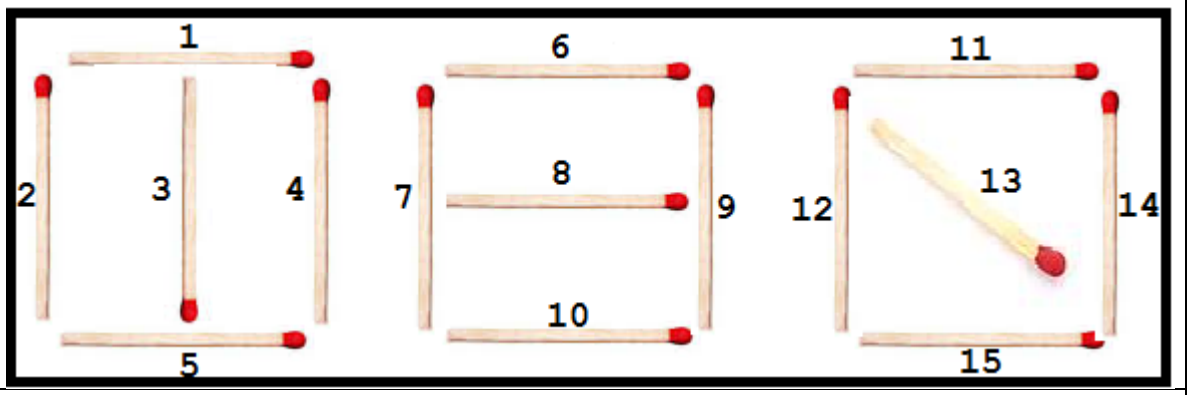
Knights of Pi Math Tournament – Jan. 7, 2017

Probability & Potpourri 5th/6th

1	A certain student must pick three classes for periods 1 through 3. There are 10 different classes offered. How many different schedules can be made?
2	A professor keeps six different books on his shelf at all times. If two of the books must be kept together at all times, but can be switched around, how many different orders are possible?
3	What is the product of the match #s you must remove to leave the word "TEN" on the board, if you must remove exactly six matches? Refer to the diagram of matches on a board below. 
4	I draw four cards, without replacement, from a standard deck of 52 cards. If all four cards have the same number value, I win. What is the probability that I win? Reduce to simplest terms.
5	My friend Mike and I live 35 miles apart. We depart from our houses at the same time to meet each other. I drive at 30 miles per hour; Mike, being more reckless, drives at 40 miles per hour. My pet hawk flies between us with a constant speed of 10 miles per hour as soon as I start. When it reaches Mike's car, it immediately turns back towards my car. When it reaches my car, it immediately turns the other direction towards Mike's car. It continues flying between us until we meet. By the time we meet, how far in miles has my pet hawk flown?
6	There are three fair coins and one fake coin in a bag. The fake coin has two heads, rather than one heads and one tails. If I blindly pull out a coin and flip it to reveal heads, what is the probability that I picked the fake coin?
7	On a gameshow, to win a prize, I must draw two balls with replacement from a bag containing 15 balls: 5 black, 5 white, and 5 striped. A striped ball counts as half a win, while a black ball counts as one win. What is the chance that I win at least once?
8	Pirates and Marines are engaged in a naval battle. The Marines must hit the Pirates once to defeat them. The Marines normally have a 3/5 chance to hit, but only have a 1/3 chance when the sun is out. There is a 4/7 chance of the sun being out. What is the chance that the Marines hit the Pirates?

9	Three friends are out together getting food. Two of them get salads that have different costs, and the third person gets the most expensive dish, a meat dish. The three statements made by the friends are as below: *Person Y: "I am a vegetarian, and the price of my dish was a square."* *Person Z: "The cost of each dish is an integer that is less than the total number of questions on this test, but greater than 1."* *Person X: "My dish cost more than Person Y's, but 1 dollar less than the average of Person Z's and Person Y's."* Who ordered the most expensive dish?
10	Six people are at a dinner party together and sit down randomly around a circular table. What is the probability that three friends, A, B, and C, sit together in that specific order?

