



Knights of Pi Math Tournament – May 16, 2009
Probability & Potpourri 7th/8th

1	How many distinct arrangements are there in the letters of the word “SUCCESS”?
2	How many ways are there to arrange two couples in five adjacent seats in a movie theater row when each person must be sitting next to his or her sweetheart?
3	95A4 is a four-digit number where A represents the tens digit. If 95A4 is a multiple of 4 and also a multiple of 9, what is the value of the digit A?
4	Bill Gates agreed to be paid \$208 plus an iPod for eight months of work. However, he had to quit the job after only five months because his family was moving. If he is paid \$70 plus the iPod, how much is the iPod worth?
5	Two cards are drawn without replacement from a standard 52 card deck. What is the probability that the first card is an ace and the second card is not an ace?
6	If $(a \# b)$ is defined as $\frac{a+b}{ab}$, evaluate $\left(\frac{2}{3} \# \frac{3}{4}\right) \# \frac{1}{2}$.
7	If your chance of getting wet each time you jump over a puddle is 1 in 11, what is your chance of getting wet if you jump over four puddles? <i>(Express as a fraction.)</i>
8	If you rolled two fair six-sided dice 729 times, how many times would you expect to get double twos? <i>(Round to the nearest whole number.)</i>
9	I am a famous mathematician. If you change the first letter of my last name, you might be able to measure how tall you are. Who am I? <i>(Give my last name.)</i>
10	When a penny is flipped 9 times, how many possible outcomes are there? (Order matters, so TTTT TTTT H and HTTT TTTT would count as different outcomes.)
11	Jack and Jill went up the hill at a rate of nine units per minute. They came tumbling down at a speed of nine units per second. What was their average speed, in units per minute, for the round trip? <i>(State as a simplified common fraction.)</i>
12	The probability my family eats out today is $\frac{1}{5}$. The probability my sister will whine all throughout dinner is $\frac{3}{4}$. And the chance that it will rain cats and dogs is $\frac{68}{119}$. If these are all independent events, what is the probability that we eat out for dinner, my sister does not whine (for once!) and it rains cats and dogs?
13	The product of four consecutive odd integers is 62,985. What is the average of those four integers?
14	Two people are playing a game to decide who is going to do the dishes. Fergie has one die and Shakira has two dice. They decide that if Fergie rolls a six before Shakira rolls a sum of seven, Fergie would win. If Shakira rolls a sum of seven before Fergie rolls a six, Shakira would win. What is the <i>percent</i> chance that Fergie loses and therefore has to do the dishes? Assume each die is fair and six-sided.
15	There are two coins in a bag. One coin has two red sides and the other coin has one red side and one white side. If a coin is randomly chosen from the bag such that the one side that can be seen is red, what is the probability that the coin’s other side is also red?

16	Add: $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{8} + \frac{1}{9} + \frac{1}{16} + \frac{1}{25} + \frac{1}{27} + \frac{1}{32} + \frac{1}{64} + \frac{1}{81} + \frac{1}{125} + \frac{1}{128} + \frac{1}{243} + \dots$
17	<p>Captain Davis Arnold is a vicious pirate. Out of every group of prisoners he takes onto his ship, everyone but one lucky soul (who will be dropped off at the next destination) has to walk the plank. To determine who the lucky one is, the Captain makes the prisoners form a circle and start counting off. The first person counted (called prisoner 1) automatically has to walk the plank and so does every second (every other) person thereafter, continuing around the circle as many times as necessary until the last person is reached. Those who have already been sentenced to the plank are not counted a second time. So if in a group of six prisoners where prisoners 1, 3, and 5 are already chosen for the plank, the Captain continues sentencing prisoners 2 and 6 so that 4 is the lucky one. In a group of five, prisoners 1,3, and 5 are sentenced first, followed by prisoner 4, so that prisoner 2 is the lucky one.</p> <p>If there are 97 prisoners in a group, which prisoner will be the lucky one? <i>(Give the prisoner's number)</i></p>
18	<p>The probability of drawing a blue marble from a bag was $\frac{3}{4}$. When 6 more blue marbles were added, the probability of drawing a blue marble became $\frac{5}{6}$. How many marbles were originally there before the additional six marbles were added?</p>
19	<p>The measures of each of the exterior angles in a triangle, a square, a pentagon, a hexagon, an octagon, and a decagon were ALL added up. This sum equals the sum of all the interior angles of a certain n-gon, where n is the number of sides the shape has. How many sides does the n-gon have?</p>
20	<div style="text-align: center;"> $\begin{array}{r} \text{MATH} \\ - \text{IS} \\ \hline \text{FUN} \end{array}$ </div> <p>Each letter in the subtraction problem above represents a unique digit. If none of the letters represent the digit 2, none of the numbers have a leading zero, and FUN is divisible by seven, then what is the value of FUN?</p>