Knights of Pi Math Tournament – May 16, 2009

Mental Math 7th/8th

Person 1

1	A huge Pop-Tart measuring 6 feet by 6 feet is cut into four identical square pieces. What is the total perimeter of the four resulting pieces, in feet?
2	There are 5 olives on a pizza for every 2 mushrooms and 4 mushrooms for every 3 pieces of Canadian bacon. If the pizza has 6 pieces of Canadian bacon, how many olives are there?
3	Jake has infinite quarters, dimes, and nickels but no pennies. How many ways can you borrow $0.30 from him to go buy food at the concession stand?
4	How many ways can you choose 3 fruits if you have 3 identical oranges, 3 identical bananas, and 3 identical grapefruits?
5	A line representing Pac-Man's position in a coordinate plane has a slope of 5. The line passes through the point 8 comma 47. What is the y-intercept of the line? Express your answer as an ordered pair.

Person 2

1	A three-layered cake has a layer of chocolate, a layer of vanilla, and a layer of carrot cake. How many distinct ways can you order the layers?
2	Andrew, Bart, Carl, Don, and Erika run in a race to the concession stand. The first person to arrive wins a free candy bar. Bart comes in before Don, but after Erika, and Erika came in after Carl. If Andrew finished last, who got the free candy bar?
3	Barney the dinosaur decides whether to eat another dinosaur by throwing two fair six-sided dice. He will eat the other dinosaur if he gets the same number on both dice. What is the probability that the other dinosaur lives? Express your answer as a reduced fraction.
4	A half-life is how long it takes for one half of a sample to decay. The radioactive element unobtainium, a key ingredient in junk food, has a half-life of 4 years. If one eighth of the original particles remain, how many years have passed since decomposition?
5	A faucet filling an empty bathtub with molten chocolate can fill it in 3 hours. A drain in the tub can empty a full tub in 6 hours. If an empty tub is being filled and drained simultaneously, in how many hours will it overflow?

Copyright © 2009

Person 3

1	A huge right triangular cracker has a leg measuring 12 feet and a hypotenuse measuring 13 feet. How long is the other leg of the cracker, in feet?
2	Each day, Austin eats a prime number of candy bars. If Austin is dieting and must not eat more than 10 candy bars per day, what is the maximum number of candy bars he can eat in a day?
3	A pancake is shaped like a regular heptagon, which has 7 sides. How many diagonals of distinct length does the pancake have?
4	The largest two-digit perfect square represents the number of years a can of Sunkist is past its expiration year. If the year is 2009, in what year did the Sunkist expire?
5	Willie the Wolf must eat 5 sheep each day to avoid starvation. Every day, 3 new sheep are born. If there are 100 sheep at the start of day one, on what day does Willie starve?

Person 4

1	The largest 2 digit positive integer that is evenly divisible by 13 is the number of cars that Meera had. If a T-Rex eats 90 of them, how many cars does she have left?
2	A right circular cone has a radius of 3 meters and a height of 4 meters. How many cubic meters of melted ice cream can it hold before overflowing?
3	A group of unemployed Wall Street bankers is standing in a line. The first 2 bankers each get 1 grain of rice. The amount given to each banker thereafter is equal to the sum of the amount that the previous two bankers received. How many grains of rice does the 7^{th} banker receive?
4	A solid chunk of milk chocolate is a right rectangular prism that is 2 kilometers long, 2 kilometers wide, and 1 kilometer tall. Kevin starts eating from one corner to the opposite corner. What is the maximum number of kilometers that Kevin travels if he eats in a straight line?
5	A right rectangular prism of tofu measuring 82 centimeters by 49 centimeters by 1 centimeter is to be cut completely into smaller chunks each with a volume of 2 cubic centimeters. How many smaller chunks of tofu can be cut?

Did we make you hungry yet? Go have lunch!

Don’t forget that there are goodies available at the concession stand!

 Copyright © 2009