#1 - ANTI-MATH-ITIS

There is a condition called Anti-Math-Itis (AMI) which is known to affect one in 10,000 people.

There exists a test for AMI that is 90% accurate. In other words, if you take the test, there is a 90% chance that it will correctly tell you whether you have AMI.

You take the test, and it comes back positive.

QUESTION:
What is the chance that you have AMI?

Ask a Scientist Pi Day Puzzle Party 3.14 2013
Wes Carroll dtmath.com / bodsat.com / wescarroll.com
Juliana Gallin askascientistsf.com

#2 - ANTS ON A LOG

Ten ants are to be placed at least one centimeter from each other on a log that is one meter long. (Note: one meter is 100cm.) Each ant can be placed facing in either direction. At a certain time, the ants all begin to walk forward at one centimeter per second. When two ants meet, they bounce off, reverse direction instantaneously, and continue walking in the opposite direction at the same speed (one centimeter per second). When an ant reaches the end of the log, it falls off.

QUESTION:
How long must you wait to guarantee that the stick is free of ants, no matter how they were originally placed?

Ask a Scientist Pi Day Puzzle Party 3.14 2013
Wes Carroll dtmath.com / bodsat.com / wescarroll.com
Juliana Gallin askascientistsf.com

#3 - BROTHERS' FORTY

As my younger brother shouted out 4 consecutive integers, I divided each by my age (an integer) then added all four remainders to get 40. As he shouted out 4 other consecutive integers, I divided each by his age (a different integer), added all 4 remainders and again got 40.

QUESTION:
What are our ages?

Ask a Scientist Pi Day Puzzle Party 3.14 2013
Wes Carroll dtmath.com / bodsat.com / wescarroll.com
Juliana Gallin askascientistsf.com

#4 - RED, WHITE & BLUE BALLS

You have two red balls, two white balls, and two blue balls.

In each set one is slightly heavier than the other.

All the heavier ones weigh the same and all the light ones weigh the same.

QUESTION:
How can you determine which is the light/heavy of each color by using a balance scale at most twice?

#5 - ISLAND EYES

A group of people with assorted eye colors live on an island. They are all perfect logicians—if a conclusion can be logically deduced, they will do it instantly. No one knows the color of his/her own eyes. Every night at midnight, a ferry stops at the island. Any islanders who have figured out the color of their own eyes then leave the island, and the rest stay. Everyone can see everyone else at all times and they keep a count of the number of people they see with each eye color (excluding themselves), but they cannot otherwise communicate. Everyone on the island knows all the rules in this paragraph.

On this island there are 100 blue-eyed people, 100 brown-eyed people, and the Guru (she happens to have green eyes). So any given blue-eyed person can see 100 people with brown eyes and 99 people with blue eyes (and one with green), but that does not tell him his own eye color; as far as he knows the totals could be 101 brown and 99 blue. Or 100 brown, 99 blue, and he could have red eyes.

The Guru is allowed to speak once (let's say at noon), on one day in all their endless years on the island. Standing before all of the islanders, she says the following: "I can see someone who has blue eyes."

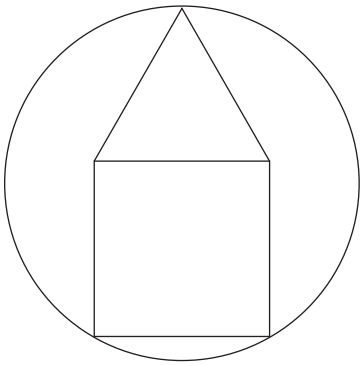
QUESTION:
Who leaves the island, and on what night? (This is purely an exercise in logic. There are no mirrors, no sign language, no secret eye contact, etc.)

Ask a Scientist Pi Day Puzzle Party 3.14 2013
Wes Carroll dtmath.com / bodsat.com / wescarroll.com
Juliana Gallin askascientistsf.com

#6 - SIZE OF SIMPLE SHAPES

An equilateral triangle sits atop a square of area 64. A circle passes through the vertices not shared by the square and the triangle, as shown.

QUESTION:
What is the diameter of this circle?



Ask a Scientist Pi Day Puzzle Party 3.14 2013
Wes Carroll dtmath.com / bodsat.com / wescarroll.com
Juliana Gallin askascientistsf.com

#7 - PENNIES

A table has an unknown quantity of pennies lying on it. Exactly 10 of the pennies are heads up and the rest are tails up. You are blindfolded and wearing mittens so that there is NO way that you can determine precisely which pennies are heads up and which are tails up. You may however pick the pennies up, move them around, and flip them over.

QUESTION:
How can you separate the pennies into two groups so that each group has exactly the same number of pennies with heads up?

(The solution does not in any way involve identifying specifically which pennies are heads up vs. tails up. The fundamental assumption is that this is impossible. And no, it does not matter how many pennies in total are on the table—only that ten of them are heads and the rest are tails.)

Ask a Scientist Pi Day Puzzle Party 3.14 2013
Wes Carroll dtmath.com / bodsat.com / wescarroll.com
Juliana Gallin askascientistsf.com

TEAM NAME: _____

#1 _____

#2 _____

#3 _____

#4 _____

#5 _____

#6 _____

#7 _____

SCORE: _____