UW Math Circle
September 26, 2013
Homework: Week 1

1. Steve took a trip this summer in which he had to visit St. Louis and Orlando. When flying from Seattle to St. Louis, he had the option of taking a layover in either Denver, Milwaukee, or Dallas. When flying from St. Louis to Orlando, he could have a layover in either Dallas, New Orleans, Nashville, or Atlanta. When flying from Orlando back to Seattle, he could have a layover in either Chicago or St. Louis. How many round-trip options does Steve have?

2. Is it possible to cut a pancake into 4 pieces by making three straight cuts? How about 5 pieces? 6? 7?

3. Pirate Jim has 8 boxes filled with gun powder that weigh 1, 2, 3, 4, 5, 6, 7, and 8 pounds, and the weight of each box is printed on its top. Pirate Bob then hid a 1-pound gold bar in one of the boxes. Pirate Jim cannot open any of the boxes, but he has a balance scale that he can use to make exactly two weighings. Can he find the gold bar?

4. When you enter the secret hall at Hogwart's, you encounter two closet doors. "This time, either both signs are true or both signs are false," says Snape.

I
Either Voldemort is behind this door or Harry Potter is behind the other one.

II
Harry Potter is behind the other door.

Which door should you open?