9/22/2015 Handout

1. Stretches

   (a) You have eight cubes that look the same, but one is slightly heavier than the others. How many weighings on a balance are required to determine the heavy cube?

   (b) Which is bigger, 100000001/100000002 or 200000001/200000002?

2. Classwork
   Do not just give an answer. Make sure to explain why what you have done works. Two people will write their solutions on the board and then we will discuss them.

   (a) *Acrobats* You are a manager of a troupe of acrobats. Each of your acrobats wears an outfit consisting of a top and tights. Both the tops and tights come in blue, red, yellow, and green and each acrobat wears a different color scheme. If all possible combinations appear (and non are repeated), how many acrobats are in the troupe?
   Next, the king wants to hire a royal team of acrobats from your troupe-four acrobats wearing tops that are all the same or of each color, and tights that are all the same or of each color. He agrees to let you send one acrobat at a time to the throne room, where they remain until he can select a royal team from the acrobats gathered there. If he pays you $100 for each acrobat you send over, how much money can you make?

   (b) Find the sum of the integers from 1 to 300 that are multiples of neither 3 nor 4.

   (c) In a room, there are 5 people, 5 dogs, and 3 cats. You have to choose 3 people, then 3 dogs, and then 2 cats. How many combinations can you make?