

Find the Fake Coin

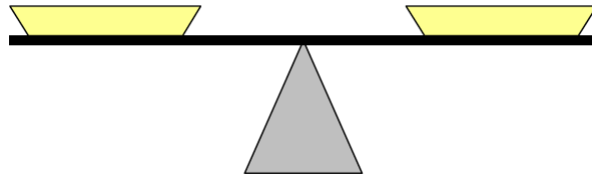
Meeting 3

October 13, 2013



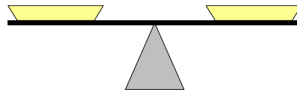
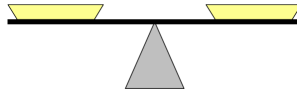
From last week:

1. Lisa puts 5 grapefruit on one side of the scale. There is a 2 pound weight on the other side of the scale.
  - a. Is the scale balanced? Why or why not?



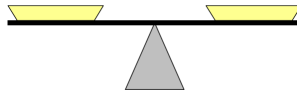
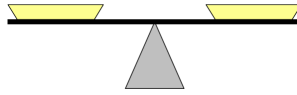
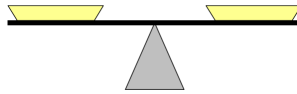
- b. Can Lisa add a watermelon or a pumpkin to one of the sides to balance the scale ?

2. a.) Suppose you have 3 coins. One of them is fake and is lighter than the other two. Use the balance scale to find the fake coin. How many tries do you need to use?



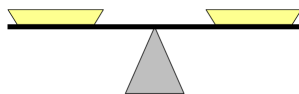
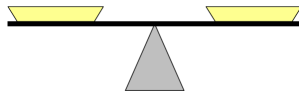
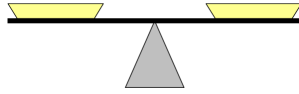
b.) Can you find the fake coin with just one try? If so, how?

- 3.
- a. Now you have 9 coins, and one of them is fake. The fake coin is lighter than the rest. Can you come up with a method that will always find the fake coin?

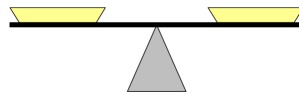
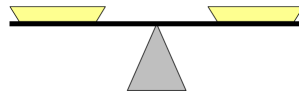
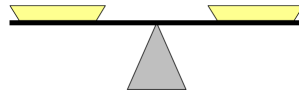


- b. Can you find the fake coin with only 2 tries?

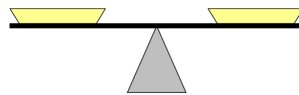
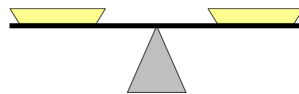
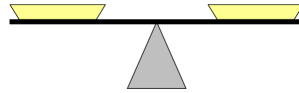
4. What if you have 12 coins and one of them is fake? You know that the fake coin is lighter than the real coins. What is the smallest amount of tries you need to use to make sure you know which one is fake?



5. Suppose you have 3 coins again, and one of them is fake. This time, you know that the fake coin has a different weight than the real coins, but you don't know whether it is lighter or heavier. How many trials do you need to find the fake coin?



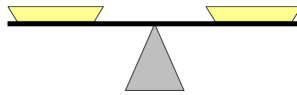
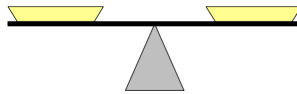
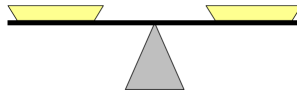
6. Now you have 6 coins and two of them are fake. The fake coins are lighter than the real coins. Can you find both fake coins in 3 trials?



**CHALLENGE:** This question is hard! Don't get frustrated if you get stuck. You can ask your parents for ideas too! :)

1.

a. Now you have 12 coins. One of them is fake and has a different weight than the rest, but you don't know if it's heavier or lighter. **Hint: Group the coins in groups of 4.**



b. Can you determine if the coin is heavier or lighter than the rest in just three trials?



