

Names: _____

Math 1120

Odds, Conditional Probability, Expected Value

02/24/2012

You have 20 of ducks, and your friend Joey is going to randomly pick one to bring home for a pet. Of the 20 ducks, 12 are white and 8 are brown. Of the white ducks, 4 have yellow feet and 8 have orange feet. Of the brown ducks, 4 have yellow feet and 4 have brown feet.

1. What are the odds Joey will pick a white duck?

2. The odds in favor of picking a white duck are the same as the odds against picking a _____ duck.

3. When Joey goes to pick a duck, he can see their feet sticking out below the fence. Joey would like a white duck, so it is better for him to pick one with orange feet since there are more white ducks with orange feet than yellow feet. What are the odds of Joey picking a white duck **given that** he picks one with orange feet?

4. Some of the ducks are baby ducks, and Joey would really really like to take home a baby duck instead of a stinky old duck. You tell Joey that the probability of picking a baby duck is $\frac{3}{20}$. Then what are the odds of picking a baby duck? What are the odds against picking a baby duck?

5. Joey picks his duck, and gets a baby brown duck with orange feet! Leaving you with 19 ducks remaining. You wish to sell the rest of the ducks as pets. The white ducks with orange feet are worth \$1000, the white ducks with yellow feet are worth \$3, and each brown duck is worth \$30. If you were to randomly pick a duck and sell it, what is the **expected value** for the amount of money you would make on that duck?

6. You decide not to sell your 19 ducks. This turns out to be a great decision on your part, because you find out that your ducks lay eggs which contain money! They lay brown, white and speckled eggs. The brown eggs contain \$10 each and the white eggs contain \$7 each. The ducks lay equal amounts of all three types of eggs. You know that the expected value of what you will get from opening a random egg is \$10.33. How much money does each speckled egg contain?
7. Each of your ducks lay about 50 eggs per year over the course of 7 years. How much money, on average, will each duck yield for you.
8. While cracking open eggs yields nice results (you get money!), it also may be to your benefit to let some of the eggs hatch so that you can get more ducks which lay money eggs. You know that the odds that a brown egg will give you a money duck are 965:1, the odds that a white egg will are 700:1 and the odds that a speckled egg will are 10000:1. Is it worth it (financially) to hatch the eggs your ducks lay?