**Quiz #2 Name: Jerry Jacob**

**Business Analytics – Des Moines (2016)**

1. (2 points) Suppose you have 1000 couples, each of whom has exactly three children and that none of the children are twins or triplets. Suppose further, that the gender of a newborn child is equally likely to be male or female. If we define the random variable X to be the number of couples whose three children are all female, then X is a binomial random variable with what parameters?

**p = 0.125 and n = 1000**

1. (6 points) Suppose a couple who both code SA for the sickle cell gene have six singly born children (eg. no twins, triplets, etc.). Hint: Take a look at problem 5 from Problem Set #2 as well as Problems 5 and 6 from problem set #3.
2. What is the probability that none of the six develop sickle cell disease?

**n=6, k=6, p=3/4**

**BINOMDIST(6,6,3/4,0) = 0.177979**

1. What is the probability that 4 or more develop sickle cell disease?

**n=6, k=3, p=1/4**

**1 - BINOMDIST(3,6,1/4,1) = 0.037598**

1. What is the probability that two or less carry the sickle cell trait but do not develop sickle cell anemia (eg. they code either SA or AS)?

**n=6, k=2, p=1/2**

**BINOMDIST(2,6,1/2,1) = 0.34375**

1. (2 points) Suppose it is known that the height of women in the United States is a normally distributed random variable with a mean of 64 inches and a standard deviation of 2 inches. What is the probability that the height of a randomly chosen woman within the United States is greater than or equal to “five foot two” (62 inches)?

**P{X<=61} = NORMDIST(k,m,s,1), where k=61, m=64, s=2 = 0.066807**

**P{X>=62} = 1 – P{X<=61} = 0.933193**