Math 157, Prof Dillon, Summer 2014, NVCC, Exam 1

Name:_____
Choose a 4 digit code: _____

Directions: You **must show enough work** that I can see your process in order for you to receive credit.   Where appropriate, answers should be written in complete sentences. You must use correct notation.

1. Suppose in a carnival game one spins a large wheel. 3/10 of the time you win nothing, 1/10 of

the time you win a teddy bear, 2/10 of the time you have to kiss a frog, and the rest of the time you win a lollypop. Let X= 0 if you win nothing, -1 if you have to kiss the frog, 1 if you get a lollypop, and 2 if you get a teddy bear.

a. Complete the pmf and cdf table below to describe the distribution of X.

x				2
f(x)=P( )				1/10
F(x)=P( )				

b) Find E(X)

c) Find Var(X)

d) Find SD(X)

2. Let's say you're at the carnival with a friend. Let Y be the result of your friend's spin of the wheel, which follows the same probability distribution as above, since it's a game of chance with no skill involved. What is the probability that:

a. You both have to kiss the frog? **What assumption must you make in order to compute that probability?** *Your answer must be in correct notation, and you must show your steps.*

b. Sticking with the assumption above, what is the probability that your friend wins a bear given that you won a lollipop? Why? *Your answer must be in correct notation.*

3. Later in the course, we'll read a study about the relationship between mental health and socio-economic status in adolescents. Let's say the authors catagorized the participants as low, middle, or high family income. For each participant, it was also determined if they did or did not

have a mood disorder, as determined by a structured interview. Suppose these were their results: (I'm not using their actual data, they analyzed it differently than this.)

family income	has disorder	does not have disorder	total
low	30	50	
middle	20	60	
high	15	48	
total			

Your answers must be in correct notation.

a. Find the probability that a randomly selected participant has a mood disorder.

b. Find the probability that a randomly selected student has a mood disorder given that he or she comes from a low SES family.

c. Is family SES independent of having a mood disorder? Justify (prove) your answer.

4) If two events are disjoint (mutually exclusive), are they independent? Justify (prove) your answer.

5) A student applies to six colleges, at each of which she has a 20% chance of being accepted. Find the probability that the student is accepted to three or more schools.

Clearly define a random variable (in english) and use correct notation. State any assumptions you are making and justify your work.