Name:

MATH 320: Review Part 1

1. Passwords for your iPhone require 6 characters.

   (a) If the first three must be digits 0-9 and the last three must be lowercase letters a-z, how many different passwords can you make?

   (b) Using the same scenario from part (a), now suppose you cannot reuse digits / letters. How many different passwords can you make?

   (c) What is the probability your friend guesses your password correctly using the scenario from part (b).

2. There is a group of 145 supporters representing England, Argentina or a different country for the world cup.

   (a) Suppose 50 people support only England, 35 people support England and Argentina, and 20 support a different country. How many people support England or Argentina?

   (b) Now suppose 85 people support a different country. How many people support England or Argentina?

   (c) Suppose 40 people support England. 75 people support Argentina and of those 25 support England. How many support a different country?

3. There are two events: A = watching Brazil vs Croatia and B = watching Portugal vs Morocco. Let $P(A) = 0.6$, $P(B) = 0.35$ and $P(A \cap B) = 0.12$. Find the following:

   (a) $P(A \mid B) =$

   (b) $P(B \mid A =$

   (c) $P(A \mid A \cup B) =$

   (d) $P(\sim B \mid \sim A) =$

   (e) Suppose now A and B are independent and we do not know $P(B)$ (we still know all other information in the setup). Find $P(B)$.

4. There are 8 teams left in the world cup.

   (a) How many different ways can the top 4 teams finish?

   (b) 4 teams move onto the next round, how many different ways can these 4 teams be selected?

   (c) What is the probability Morocco and Netherlands are selected to move onto the next round?

   (d) What is the probability Morocco or Netherlands are selected to move onto the next round?

5. Suppose you roll an 8-sided die. Let A = odd numbers and B = numbers less than or equal to 4. Show if A and B are independent or not mathematically using TWO different ways.

6. France scores 0 goals in 20% of their games, one goal in 50% of their games, and 2 goals in 30% of their games. When they do not score, there is a 20% chance of winning; when they score one goal, there is a 40% chance of winning; when they score two goals, there is a 80% chance of winning. Assume they can only win or lose (no ties).

   (a) What is the probability France wins?

   (b) What is the probability France loses?

   (c) If France wins, what is the probability that they scored one goal?

   (d) If France loses, what is the probability that they scored?