Assignment 3: Quiz

1. (2 pts)
During the last hour, a telemarketer dialed 20 numbers and reached 4 busy signals, 3 answering machines, and 13 people. Use this information to determine the empirical probability that the next call will be answered in person.

Out of 20 calls 13 were answered in person. So the probability of a call being answered in person is : $\frac{13}{20}$

2. (2 pts)
If you roll a die many times, what would you expect to be the relative frequency of rolling a number less than 6?
A) 2 out of 3 B) 1 out of 3 C) 1 out of 6 D) 1 out of 2 E) 5 out of 6

There are six total outcomes and 5 favorable ones so the relative frequency will be 5 out of 6. Answer E

3. (2 pts)
A jar contains 5 yellow marbles, 16 green marbles, and 8 black marbles. If one marble is selected at random, what is the probability that it is not green?

Not green means either yellow or black. Total number of yellow and black marbles = 13
Total number of marbles = 29
Probability of not green = $\frac{13}{29}$

4. (2 pts)
One card is selected at random from a standard 52-card deck of playing cards. Find the probability that the card selected is a red king.

There are two red kings in the whole deck (diamonds and hearts)
So probability is $\frac{2}{52} or \frac{1}{26}$

5. (2 pts)
The odds against Thunderbolt winning the Sarasota Derby are 9: 2. Find the probability that Thunderbolt wins.

A) 9/20 B) 11/20 C) 9/11 D) 2/11 E) 2/9
9:2 = 4.5:1
Answer E

6. (4 pts)

1000 tickets for prizes are sold for $2 each. Seven prizes will be awarded – one for $400, one for $200, and five for $50. Steven purchases one of the tickets.
a) Find the expected value
b) Find the fair price of the ticket.

Expected Winnings = $\frac{1}{1000}(400)+\frac{1}{1000}(200)+\frac{5}{1000}(50)=\frac{17}{20}=.85$
Cost of ticket = $2

Expected Gain/Loss = -1.15

Fair price is when gain/loss = 0 or when expected winnings = cost of ticket = $ .85

7. (2 pts)
Two balls are to be selected without replacement from a bag containing one red, one blue, one green, one yellow, and one black ball. How many points are there in the sample space?
There are five colors available for the first draw
There are four colors available for the second draw
Total points in space are 5x4=20 (assuming ordering is not important)

8. (3 pts)
A license plate is to consist of two letters followed by three digits. How many different license plates are possible if the first letter must be a vowel, and repetition of letters is not permitted, but repetition of digits is permitted?

First letter is restricted to A,E,I,O,U (5 choices)
Second letter has only one restriction that it is not the same as the first letter (25 choices)
No restrictions for digits so 10x10x10=1000 choices

So total numer of choices are 5x25x1000=125000

9. (2 pts) A man has 8 pairs of pants, 5 shirts, and 3 ties. How many different outfits can he wear?

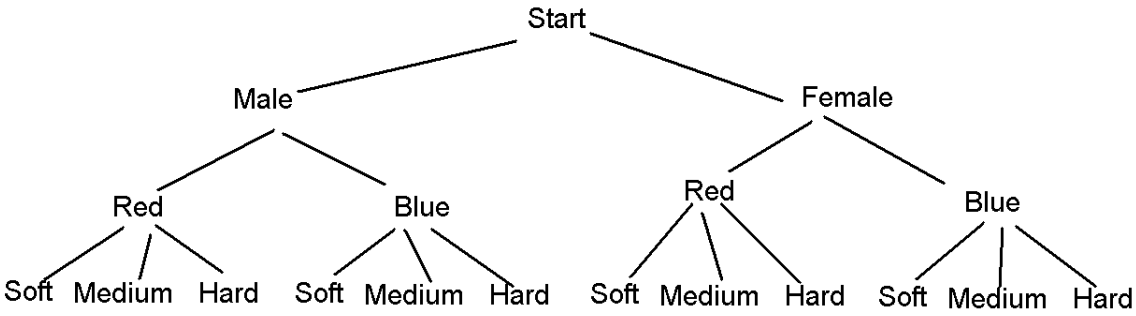
Type/Number of each represents a unit of choice. Total number of choices are 8x5x3=120

10. (9 pts)
A specific brand of bike comes in two frames, for males or females. Each frame comes in a choice of two colors, red and blue, and with a choice of three seats, soft, medium, and hard.

a) Use the counting principle to determine the number of different arrangements of bicycles that are possible.

Male/Female (2 choices) x Color (2 choices) x Seat (3 choices)
Total arranagements are 2x2x3 = 12

b) Construct a tree diagram illustrating all the different arrangements of bicycles that are possible.



c) List the sample space.
(Male, Red, Soft) (Male, Red, Medium), (Male, Red, Hard)
(Male, Blue, Soft) (Male, Blue, Medium), (Male, Blue, Hard)
(Female, Red, Soft) (Female, Red, Medium), (Female, Red, Hard)
(Female, Blue, Soft) (Female, Blue, Medium), (Female, Blue, Hard)

11. (3 pts) The results of a survey for an airline are shown below

Traveler	Male	Female	Total
Business	57	92	149
Vacation	72	74	146
Total	129	166	295

Use the chart to find the probability that the traveler was

a) male

Total number of travelers = 295

Total number of male travelers = 129

Probability that a traveler was male = $\frac{129}{295}$

b) on vacation given the traveler was male

Probability of being on vacation = $\frac{146}{295}$

Probability of being a male and on a vacation = $\frac{72}{295}$

So probability of being a male given he is on a vaction = $\frac{\frac{72}{295}}{\frac{146}{295}} = \frac{36}{73}$

c) female given the traveler was on business

Same reasoning as part b: $\frac{92}{149}$

12. (2 pts) In how many ways can 7 instructors be assigned to seven sections of a course in mathematics?
Ordering is relevant here so we want to permute 7 instructors with 7 sections = 7P7= 5040. (or simply 7!)

13. (4 pts) At an annual flower show, 6 different entries are to be arranged in a row.
a) How many different arrangements of the entries are possible?
Ordering is important we can have 6 choices for first, 5 choices for second…and so on
To get 6! Choices = 720 arrangements

b) If the owners of the 1st, 2nd, and 3rd place entries will be awarded prizes of $100, $50, and $25 respectively, how many ways can the prizes be awarded?
6 choices for 1st , 5 choices for 2nd and 4 choices for 3rd. No more options so we have 6x5x4 options = 120 different ways in which the first three are relevant

14. (2 pts) How many different ways are there for an admissions officer to select a group of 7 college candidates from a group of 19 applicants for an interview?

In this case ordering is not important so we get 19 choose 7 = 19!/7!(12!)=50388 choices