Math 1300 Fall 2013
Quiz 5
Wednesday October 30 2013
No Work = No Credit

Name: _____ **Student Number:** _____

Signature: _____

Instructor: _____ **Section:** _____

Instructions: Answer all questions and show all of your work.

Problem	Points	Student's Score
1	1	
2	1	
3	4	
4	2	
5	2	
Total:	10	

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1. (1 point) The University of Missouri football team 2013 roster lists 117 players. In how many different ways can the team elect 4 captains?

Solution:

$$C(117, 4) = \boxed{7,413,705}$$

2. (1 point) The Mizzou Actuarial Club can elect a President and Vice President in 1892 different ways. How many members are in the club?

Solution:

$$P(n, 2) = n(n-1) = 1892 \longrightarrow n^2 - n - 1892 = 0$$

$$n = \frac{1 \pm \sqrt{1 - (4)(1)(-1892)}}{(2)(1)} \longrightarrow n = \frac{1 \pm 87}{2}$$

$$n = \boxed{44}$$

3. A fair coin is tossed 10 times and the sequence of Heads (H) and Tails (T) is observed.
   (a) (1 point) How many different outcomes have 7 Hs?

Solution:

$$C(10, 7) = \boxed{120}$$

   (b) (1 point) How many different outcomes have 3 Hs?

Solution:

$$C(10, 3) = \boxed{120}$$

   (c) (1 point) How many different outcomes have at least 7 Hs?

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Solution:

$$C(10,7) + C(10,8) + C(10,9) + C(10,10) = 120 + 45 + 10 + 1 = \boxed{176} \quad (1)$$

(d) (1 point) How many different outcomes have 3 Ts where there are no consecutive Ts in the sequence?

Solution:

$$\underset{1}{\uparrow}\ \boxed{H}\ \underset{2}{\uparrow}\ \boxed{H}\ \underset{3}{\uparrow}\ \boxed{H}\ \underset{4}{\uparrow}\ \boxed{H}\ \underset{5}{\uparrow}\ \boxed{H}\ \underset{6}{\uparrow}\ \boxed{H}\ \underset{7}{\uparrow}\ \boxed{H}\ \underset{8}{\uparrow} \quad (2)$$

$$C(8,3) = \boxed{56} \quad (3)$$

4. An urn contains 20 numbered balls. 11 of the balls are red, 9 of the balls are blue. A sample of 4 balls is drawn from the urn.

(a) (1 point) Given that the balls are numbered and can be distinguised from each other, how many different samples of 4 balls are possible?

Solution:

$$C(20,4) = \boxed{4845}$$

(b) (1 point) How many different samples contain 2 red balls and 2 blue balls where the colors can be in any order?

Solution:

$$C(11,2) \cdot C(9,2) = (55)(36) = \boxed{1980}$$

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5. At a wedding, the bride, groom, best man, maid of honor, parents of the bride and parents of the groom sit in a row at the head table.

   (a) (1 point) In how many different ways can these 8 people be seated if the bride and groom, best man and maid of honor, parents of the bride and parents of the groom are seated next to each other as couples?

   Solution:

   $$(4!)(2)(2)(2)(2) = (24)(16) = \boxed{384}$$

   (b) (1 point) In how many different ways can these 8 people be seated if the bride, maid of honor and parents of the bride are seated in the left 4 seats in any order with the groom, best man and parents of the groom seated in the right 4 seats in any order?

   Solution:

   $$(4!)(4!) = (24)(24) = \boxed{576}$$