Show all work.
Simplify your answers.
Circle your answer.

No notes, no books, no calculator, no cell phones, no pagers, no electronic devices.

Name⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

Circle your Discussion Section:

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DIS 332   9:55 R 395 VAN HISE
DIS 331   9:55 T  52 BASCOM
DIS 335 12:05p T 123 INGRAHAM
DIS 336 12:05p R 114 INGRAHAM
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Problem	Points	Score
1	5	
2	5	
3	5	
4	5	
5	5	
6	5	
7	5	
8	5	
9	5	
10	5	
11	5	
12	5	
Total	60	

Solutions will be posted shortly after the exam: www.math.wisc.edu/~miller/m210

1. (5 pts) Suppose a coin is weighted so that when the coin is flipped the result is heads 5 times as often as tails. What probabilities should be assigned to the outcomes "heads" and "tails"?

2. (5 pts) Suppose $A = \{a, b, c\}$ and $B = \{b, d\}$. What is

(a) $A \times B$

(b) $A \cup B$

(c) $A \cap B$

(d) $A \cap B'$

3. (5 pts) There are two buckets, labeled X and Y. Bucket X contains 1 red and 2 green balls, and bucket Y contains 2 red and 5 green balls. An experimenter randomly chooses two balls from bucket X and adds them to bucket Y. He then randomly chooses a ball from bucket Y. What is the probability this ball is red?

4. (5 pts) Each Monday morning Max attends Math210 with probability 1/2 and skips Neurobiology302 with probability 2/3. He attends both with probability 1/6. What is the probability that he goes to exactly one of the lectures?

5. (5 pts) Professor Throckmorton has 15 M & M candies in his pocket. 6 are his favorite blue ones and 9 are green one. He randomly reaches into his pocket and chooses 3 candies. Given that all three candies he has chosen are the same color what is the probability he has chosen all blue candies?

6. (5 pts) At a ballroom dance there are 4 girls and 5 boys. One of the boys is Mortimer who has a secret crush on one of the girls, Hortense. At the end of the lesson the instructor chooses two boy-girl couples to demonstrate the fox trot. What is the probability that one of the couples chosen is Mortimer and Hortense?

7. (5 pts) Let A and C be sets with $A \subseteq C$. Suppose that $n(A) = 4$ and $n(C) = 12$. In how many different ways can you select B so that $A \subseteq B$, $B \subseteq C$, and $n(B) = 5$?

8. (5 pts) In a survey 50 families, it was found that 26 families had at least one daughter, 32 familes had at least one son, and 18 had at least one daughter and at least one son. How many families had no children?

9. (5 pts) A basketball player makes on average 2 out of every 3 penalty shots. How many shots must he take to ensure that he has probabability at least .95 of making at least one shot? (Make sure you explain your answer for this one.)

10. (5 pts) At Taco bell there are 10 ingridients for making burritos including tortillas, beans, cheese, and seven others. A burrito is prepared by combining up to six of these 10 ingridients but always including a tortilla, beans, and cheese. How many different burritos can Taco bell sell? (Note: an ingridient is either chosen or not, no doubling.)

11. (5 pts) Max is going on a road trip across Wisconsin. He plans to visit friends in Beloit, Green Bay, Janesville, Madison, and Wausaw. He can visit them any order except he must visit Beloit before he visits Green Bay, because he needs to take something from his friend in Beloit to his friend in Green Bay. How many different travel iternaries can he have?

12. (5 pts) A forester plants seeds from Oak, Pine, or Walnut trees in his forest. It is known that a random Oak seed or Pine seed germinates with probability 1/2 while a Walnut seeds germinates with probability 1/3. A new forest has been planted randomly with 1/3 Oak, 1/6 Pine, and 1/2 Walnut. A few weeks latter the forester sees that one of the seeds has germinated. What is the probably that this seedling is an Oak?

Answers

1.
heads:5/6
tails:1/6

2.
(a) $\{(a,b),(a,d),(b,b),(b,d),(c,b),(c,d)\}$
(b) $\{a,b,c,d\}$
(c) $\{b\}$
(d) $\{a,c\}$

3. 8/27

4. 1/2

5. 5/26

6. 1/10

7. 8

8. 10

9. 3

10. 64

11. 60

12. 2/5