Review Problems for Math 107 Exam 5

The "actual" exam will be a take–home that you must complete without assistance. However, the exam problems will be similar to these sample problems for which you may obtain assistance from peers, tutors and your instructor.

Solve the following. Show all work to justify your answer.

List all equally likely outcomes in the sample space for the indicated experiment.

1) A box contains 3 blue cards numbered 1 through 3, and 4 green cards numbered 1 through 4. List the sample space of picking a blue card followed by a green card. 1) _____

Write the event as a set of outcomes.

2) We select a black Jack from a standard 52–card deck. 2) _____

Construct a Punnett square for the stated situation.

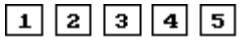
3) Show the genetic possibilities for a child whose mother has cystic fibrosis and whose father is a carrier of cystic fibrosis. Denote the normal gene by N and the cystic fibrosis gene by c to indicate its recessive nature. 3) _____

Use a Punnett square constructed for the stated situation to answer the associated question.

4) In crossbreeding certain types of flowers, color does not dominate. For example, a flower with one blue gene and one red gene will have purple flowers. Consider the result of crossing a pure–bred blue flower with a pure–bred red flower. What is the probability of getting red flowers in the first generation plants? 4) _____

Solve the problem.

5) 5) _____



What are the odds of drawing an even number from these cards?

6) If two fair dice are rolled, what is the probability that a total of three shows? 6) _____

7) The odds in favor of a horse winning a race are posted as 5 : 2. Find the probability that the horse will win the race. 7) _____

Answer the question.

8) If $P(A) = \frac{3}{10}$ then find the odds against A happening. 8) _____

Use the complement formula to answer the question.

9) If two fair dice are rolled, what is the probability that a total showing is more than three? 9) _____

Solve the problem.

10) If a single card is drawn from a standard 52–card deck, what is the probability that it is either a four or a heart? 10) _____

Find the requested probability.

11) If $P(A \cup B) = 0.62$, $P(A) = 0.34$, and $P(B) = 0.47$, find $P(A \cap B)$. 11) _____

Solve the problem.

12) Bob earns both a salary and a commission as a salesman at an auto dealership. The following table lists his estimates of the probabilities of earning various commissions for the next month: 12) _____

Commission	Probability that this will happen
Less than $500	0.18
$500 – $999	0.25
$1000 – $1499	0.23
$1500 – $1999	0.17
$2000 – $2499	0.12
$2500 – $2999	0.03
$3000 – $3499	0.02

What is the probability that he will earn at least $500 in commissions?

Find the indicated probability.

13) You roll two fair dice. Let E be the event that an even total shows on the dice. Let F be the event that a two shows on at least one of the dice. Find P(F) and P(F|E). 13) _____

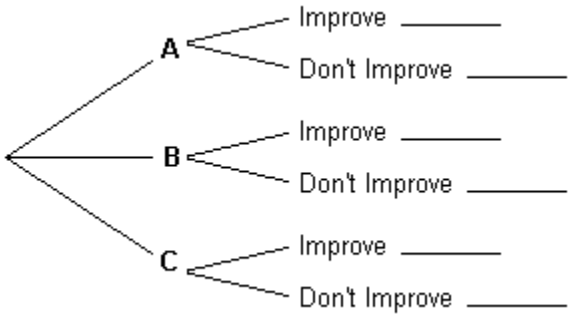
14) The following table relates the grades in an advanced mathematics course to the student's year in college: 14) _____

	A	B	C	D	E	Totals (%)
Freshmen	3	5	6	4	1	19
Sophomores	6	6	8	2	3	25
Juniors	5	7	11	6	2	31
Seniors	5	4	1	3	5	18
Grad Students	3	2	2	0	0	7
Totals (%)	22	24	28	15	11	100

Let E be the event that the student received a grade of B. Let F be the event that the student is a sophomore. Find P(F|E).

Imagine that you are taking part in a study to test a new cold medicine. Although you don't know exactly what drug you are taking, the probability that it is drug A is 30%, that it is drug B is 10%, and that it is drug C, 60%. From past clinical trials, the probabilities that these drugs will improve your condition are: A (20%), B (50%), and C (70%).

15) Fill in the probabilities on the following tree to illustrate this drug trial situation. 15) _____



16) What is the probability that you will improve given that you are taking drug A? 16) _____

17) What is the probability that you will improve given that you are taking drug B? 17) _____

18) What is the probability that you will improve given that you are taking drug C? 18) _____

19) What is the probability that you will improve? 19) _____

20) What is the probability that you don't improve? 20) _____

21) If you improve, what is the probability that you are taking drug A? 21) _____

22) If you improve, what is the probability that you are taking drug B? 22) _____

23) If you improve, what is the probability that you are taking drug C? 23) _____

Solve the problem.

24) If two fair dice are rolled, find the probability of a sum of 6 given that the roll is a "double". 24) _____

25) If two cards are drawn without replacement from a deck, find the probability that the second card is red, given that the first card was a heart. 25) _____

26) A survey revealed that 50% of people are entertained by reading books, 32% by watching TV, and 17% are entertained by both books and TV. What is the probability that a person will be entertained by books or TV? 26) _____

27) A survey of senior citizens at a doctor's office shows that 45% of the seniors take blood pressure lowering medication and 43% take cholesterol lowering medication. 6% take both medications. What is the probability that a senior citizen takes only one of these medications given that he or she takes at least one of the medications? 27) _____

28) You are playing a game in which a single die is rolled. If a 2 or a 5 comes up, you win $48, otherwise you lose $30. What is your expected value for the game? 28) _____

29) You are playing a game in which a single die is rolled. If an even number comes up, you win $11. If an odd number comes up, you lose $11. Is this a fair game? 29) _____

30) You are playing a game in which a single die is rolled. If a 2 or a 5 comes up, you win $30, otherwise you lose $3. What is the price that you should pay to play the game that would make the game fair? 30) _____

31) A student is taking a standardized test consisting of multiple choice questions for which there are five options for each question. Seven points are awarded for each correct answer, but the student loses 2 points for an incorrect answer. Questions left blank neither receive nor lose points. Is it in the student's best interest to guess? 31) _____

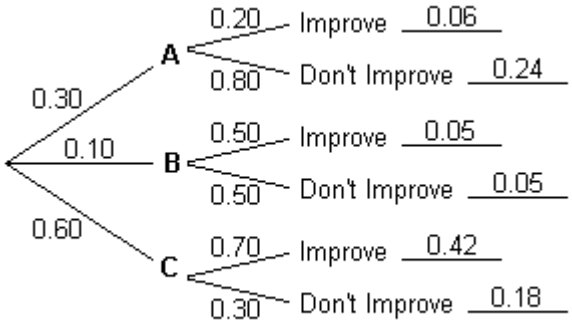
32) Assume that you have a car worth $6750 and you wish to insure it for its full replacement value if it is stolen. If there is a 1% chance that the car will be stolen, what would a fair premium price be? 32) _____

Answer Key
Testname: MATH 107 SAMPLE PROBLEMS FOR CH 13

1) {(1, 1), (1, 2), (1, 3), (1, 4),
(2, 1), (2, 2), (2, 3), (2, 4),
(3, 1), (3, 2), (3, 3), (3, 4)}
2) {Jack of spades, Jack of clubs}
3)

		Father	
		N	c
Mother	c	cN	cc
	c	cN	cc

4) 0
5) 2 : 3
6) $\frac{1}{18}$
7) $\frac{5}{7}$
8) 7 : 3
9) $\frac{11}{12}$
10) $\frac{4}{13}$
11) 0.19
12) 0.82
13) $P(F) = \frac{11}{36}$, $P(F|E) = \frac{5}{18}$
14) $\frac{1}{4}$
15)



16) 0.20
17) 0.50
18) 0.70
19) 0.53
20) 0.47
21) 0.113
22) 0.094
23) 0.792
24) $\frac{1}{6}$
25) $\frac{25}{51}$
26) 0.65
27) 0.930
28) –$4
29) Yes
30) $8
31) No
32) $68.18