Advanced Algebra
Review - Chapter 10
May 2, 2016

Name:_____ Per:_____

I. Probability and the Counting Principle. Show all steps and work. Round probabilities to four decimal places.

(a) How many different shirt, pants, and shoes outfits can you make if you have 9 different shirts, 12 different pairs of pants, and 5 different pairs of shoes?

(b) How many ways can you answer a true/false test of 25 questions?

(c) The security code for an alarm uses the digits 1-6. (i) If the code is 4 digits long, how many different codes are possible? (ii) What is the probability of guessing a 4 digit code? (iii) How long should the code be in order the make the probability of guessing the correct code to be less than 1/2,000,000?

II. Permutations and Combinations. Simplify and reduce any expressions with factorials or fractions BEFORE using your calculator to multiply. Show all steps!! Round probabilities to four decimal places.

(a) How many ways can a field of 15 horses finish a race with a 1st, 2nd, and 3rd place winners?

(b) How many ways can those 15 horses be arranged around an oval feeding trough?

(c) How many ways can you arrange the letters in the word **SUPERCILIOUSNESS**?

(d) How many different buffet combinations of 4 appetizers, 3 entrees, and 2 desserts can be created by a caterer who can prepare 7 appetizers, 10 entrees, and 5 desserts?

(e) What is the probability that you choose a ring questing posse of 6 elves and 4 dwarves if you randomly select 10 magical folk from a group of 11 elves and 9 dwarves.

III. Inclusive/Exclusive & Independent/Dependent Events.

(a) Find the probability for events A and B and P(A & B) when rolling two dice. Then determine whether the pair of events are inclusive or exclusive and find P(A or B). Next determine whether A and B are independent or dependent.

(i) event A: sum > 8, event B: sum is even
(ii) event A: sum is 7, event B: sum is odd
(iii) event A: sum < 4, event B: sum is 7 or 9
(iv) event A: rolling < 3 on die #1, event B: rolling an odd number on die #2
(v) event A: rolling < 4 on die #1, event B: sum < 5

Note: express probabilities as reduced fractions.

die #2 \ die #1	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

(b) When rolling a pair of dice, find the following probabilities (leave probabilities as fractions):

(i) the sum is 9
(ii) the sum is 9 on four consecutive rolls of the dice
(iii) the sum is 9 on only one of four consecutive rolls of the dice
(ec) the sum is 9 on exactly two rolls of four consecutive rolls of the dice

IV. Conditional Probability and Dependent Events.

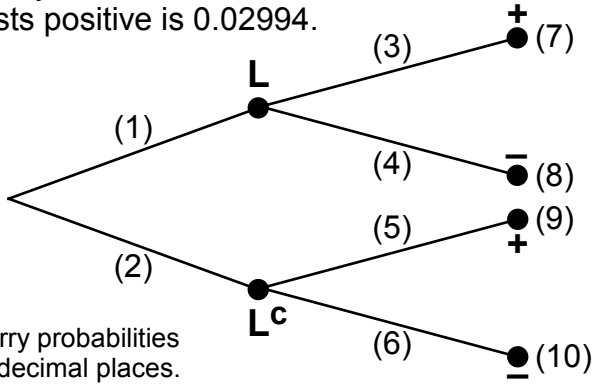
(a)

	Bow/ Arrow (B)	Sword (S)	Ax (A)	
Dwarf (D)	10	12	20	42
Elf (E)	24	18	8	50
	34	30	28	92

(i) Find the following probabilities using the information from the table: P(D), P(E), P(B), P(S), P(A), P(B or A), P(B & A), P(D & S), P(E & B), P(D|S), P(S|D), P(E|B), P(B|E).

(ii) Find the following probabilities using the conditional probability formula: P(D & S), P(S|D), P(E & B), P(E|B).

(b) Lyme Disease is a tick-borne disease present in the U.S. and Europe. Diagnosis of the disease is aided by a test which detects particular anti-bodies in the blood. The probability that someone actually has Lyme Disease is 0.002. The prob. that someone tests positive for the disease given that they have the disease is 0.937. The probability that someone doesn't have the disease and tests positive is 0.02994.



Note: carry probabilities out to 6 decimal places.

(i) Give the symbol and value for each of the ten probabilities in the tree. Follow the example.
(1) **P(L) = 0.002**

(ii) Find the prob. that someone tests negative.
(iii) Find the prob. that someone has the disease given that they test positive.
(iv) Find the prob. that someone doesn't have the disease given that they test negative.