Math 132 Test #2 Name _____

1) True or False

___ a) $6! = 6 \cdot 5!$ ___ b) $_6P_2 = 30$

___ c) $\binom{10}{9} = 20$ ___ d) $\binom{13}{7} = \frac{13 \cdot 12 \cdot 11 \cdot 10 \cdot 9 \cdot 8}{6!}$

___ e) $0! = 0$ ___ f) $\binom{50}{49} = \binom{50}{1}$

2) 5 men and 3 women are available to form a committee of 4. If the committee must have 2 men and 2 women how many different committees can be formed?

3) There are 6 roads from New York to Boston and 3 roads from Boston to Bangor. How many ways can you make the trip?

(a)

(b) what if you want to come back to New York by using different roads. How many ways can you make the round trip?

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Name _____

4) For the game of dice.
   a) what is the probability of getting an 8?

   b) what are the odds for getting an 8?

5) If the odds are 7/2 that horse A will win a race
   a) what is the probability that horse A will win?

   b) would you bet on horse A? why?

6) A shipment of 10 T.V.'s is known to contain 2 T.V.'s that are defective. Find the probability that:
   a) a T.V. selected at random will be defective

   b) That if 3 T.V.'s are selected
      (i) None are defective

      (ii) only one is defective

      (iii) all 3 are defective

11 Name _____

7) Given $P(A)=.5$ $P(B)=.3$ $P(A \cap B)=.1$

find a) $P(A \cup B) =$

b) are A, B mutually exclusive events?

c) $P(A' \cap B') =$

d) are A, B Independent events?

8) If $P(A)=.4$ and $P(A \cap B)=.12$ and A, B are Independent Events. find $P(B) =$

9) using combination symbols (notation), $\binom{n}{r}$, write out

a) the expansion of $(x+y)^7$

$(x+y)^7 =$

b) for $(x+y+z+w)^5$

c) How many terms are in the expansion?

find the coefficient of:

(i) $(x^2 y z^2)$.

(ii) $(x^2 y z w)$

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Name _____

10) $P(M) = .3$ $P(N) = .4$ and M, N are Mutually Exclusive events find:

a) $P(M \cap N)$

b) $P(M \cup N)$

c) $P(M|N)$

11) In an article titled "Why Quitting Means Gaining" in Time Mag. March 25, 1991 the concern is giving up cigarettes will result in gaining weight.

Data

Gains	Major	Significant	Moderate	Slight	Totals
Men	9%	14%	22%	55%	100%
Women	12%	11%	26%	50%	*99%

* due to rounding off - womens total is not 100%

Suppose the group studied was 60% men and 40% women. If a participant is selected at random and found to (i) have a major weight gain find the prob. it was a man.

(ii) have a slight weight gain. Find the prob it was a women

VI

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12) a. If 600 lottery tickets are sold for a cash prize of $150, what is the mathematical expectation of a person who buys one of these tickets for $1?

b. A grab-bag contains 6 packages worth $2 each, 11 packages worth $3, and 8 packages worth $4 each. Is it reasonable to pay $3.50 for the option of selecting one of these packages at random?

13) In a certain College, 4% of the men and 1% of the women are taller than 6 feet. Furthermore, 60% of the students are women. If a student is selected at random and is taller than 6 ft, what is the probability that the student is a women?

Bonus Problem

Lie detectors have been used during wartime to uncover security risks. As is well known, lie detectors are not infallible. Let us suppose that the probability is 0.10 that the lie detector will fail to detect a person who is a security risk and that the probability is 0.08 that the lie detector will incorrectly label a person who is not a security risk. If 2% of the persons who are given the test are actually security risks, what is the probability that

(a) a person labeled a security risk by a lie detector is in fact a security risk;

(b) a person cleared by a lie detector is in fact not a security risk?