Math 169 : Math for Elementary Teachers II NAME _____
(Spring 2008) Second Exam (Chapter 7) TICKET #_____

Follow stated directions...

Display all answers to probability problems in reduced, fractional form, unless otherwise directed to do so.

1.

Suppose you draw a card from a well-shuffled deck of 52 cards. Determine the following probabilities.

What is the probability of drawing a 7 or a king? ☐
(Simplify your answer. Type a fraction.)

What is the probability of drawing a heart? ☐
(Simplify your answer. Type a fraction.)

What is the probability of drawing a red card? ☐
(Simplify your answer. Type a fraction.)

What is the probability of drawing a black 7? ☐
(Simplify your answer. Type a fraction.)

2.

A marble is selected at random from a jar containing 4 red marbles, 6 yellow marbles, and 5 green marbles. What is the probability that
a) the marble is red?
b) the marble is not yellow?
c) the marble is either red or green?
d) the marble is neither red nor green?

What is the probability that the marble is red? ☐
(Simplify your answer. Type a fraction.)

What is the probability that the marble is not yellow? ☐
(Simplify your answer. Type a fraction.)

What is the probability that the marble is red or green? ☐
(Simplify your answer. Type a fraction.)

What is the probability that the marble is neither red nor green? ☐
(Simplify your answer. Type a fraction.)

3.

A carnival roulette wheel contains 32 slots numbered 00, 0, 1, 2, 3, ..., 30. 15 of the slots numbered 1 through 30 are colored red, and 15 are colored black. The 00 and 0 slots are uncolored. The wheel is spun, and a ball is rolled around the rim until it falls into a slot. Determine the following probabilities.

What is the probability that the ball falls into a black or red slot? ☐
(Simplify your answer. Type a fraction.)

What is the probability that the ball falls into an odd numbered slot? ☐
(Simplify your answer. Type a fraction.)

What is the probability that the ball falls into a red or an uncolored slot? ☐
(Simplify your answer. Type a fraction.)

What is the probability that the ball falls into the slot numbered 20 or an uncolored slot? ☐

4.

Sentinel High School was found to have the number of students listed below.

Classes	Number
Freshman	536
Sophomore	488
Junior	549
Senior	427

If one student is chosen from the school, what is the probability that the chosen student is a junior?

The probability is ☐.
(Simplify your answer. Type an integer or a fraction.)

5.

70 men and 50 women are enrolled in calculus. There are 30 business majors, 40 biology majors, 20 computer science majors, and 30 mathematics majors. No person has a double major. If a single calculus student is chosen, find the following probabilities.

Find the probability that the student is a biology major.

P(biology) = ☐

(Simplify your answer. Type a fraction.)

Find the probability that the student is not a business major.

P(not business) = ☐

(Simplify your answer. Type a fraction.)

Find the probability that the student is a biology major or a business major.

P(biology ∪ business) = ☐

(Simplify your answer. Type a fraction.)

6.

A box contains 9 white balls, 6 black balls, and 8 red balls.

a) How many red balls must be added to the box so that the probability of drawing a red ball is $\frac{9}{10}$?

b) How many black balls must be added to the original box so that the probability of drawing a white ball is $\frac{1}{10}$?

a) ☐ red balls would have to be added.

b) ☐ black balls would have to be added.

7. Hint: A couple of tree diagrams [one each for part (a) and (b)] might be helpful.

A box contains 4 yellow balls and 7 green balls. Two balls are drawn at random from the box.

a) If the first ball is drawn and not replaced, the probability that two balls will be drawn of different colors is ☐.

(Simplify your answer. Type an integer or a fraction.)

b) If the first ball is drawn and then put back, the probability that two balls will be drawn of different colors is ☐.

(Simplify your answer. Type a integer or a fraction.)

8. Hint: A tree diagram &/or the application of the Fundamental Counting Principle might be helpful.

An executive committee consists of 12 members: 4 men and 8 women. 3 members are selected at random to attend a meeting in Hawaii. The names are drawn from a hat. What is the probability that all 3 selected are women?

The probability that all selected are women is ☐.

(Simplify your answer. Type an integer or a simplified fraction.)

9. Hint: A tree diagram would definitely be helpful.

Below are three boxes containing black and white balls. The number of each color is noted inside the box. Draw a ball from box 1 and place it in box 2. Then draw a ball from box 2 and place it in box 3. Finally draw a ball from box 3.

Box 1	Box 2	Box 3
6 white	2 white	2 white
4 black	4 black	2 black

a) What is the probability that the last ball, drawn from box 3, is white?

[ ] (Type a simplified fraction.)

b) What is the probability that the last ball drawn is black?

[ ] (Type a simplified fraction.)

10.

Assume the probability is $\frac{1}{2}$ that a child born is a boy. If a family has three children, what is the probability that they have a) exactly one boy? b) at most two girls?

a) The probability of getting exactly one boy is [ ].

b) The probability of getting at most two girls is [ ].

11. Hint: A Venn diagram might be helpful.

There are 70 employees in a certain firm. We know that 38 of these employees are male, 14 of these males are secretaries, and 30 secretaries are employed by the firm. What is the probability that an employee chosen at random is a secretary, given that the person is a female?

The probability is [ ]. (Type a simplified fraction.)

12. You need to explain how you plan on using the (pseudo) random digit table in this simulation.

The weather forecast for a given village in the rainy season is that the chance of rain is 60% on any given day. Use the random digit table to estimate the probability of rain in this village for 3 days in a row.

981	447	164	400
354	895	155	447
354	575	824	575
558	411	445	773
540	584	564	354

The probability that it will rain for 3 days in a row is about ____.
(Simplify your answer. Type an integer or a fraction.)

13.

Pick a block of 4 digits from a random-digit table. What is the probability that the block picked is less than 5000?

The probability is ____.
(Simplify your answer. Type an integer or a fraction.)

14. Start at the top of this (pseudo) random digit table in this simulation, and follow the directions noted below the (pseudo) random digit table.

In a baseball playoff series, the two teams are evenly matched. The two teams must play until one team wins 4 games, and no ties are possible. Use the rows of random numbers shown to approximate the probability that the series will end in 4 games.

3	5	4	3	6	3	4
6	3	8	7	4	4	8
0	7	6	3	6	3	4
3	2	4	8	5	1	6
4	1	5	2	9	7	8
2	5	8	6	4	1	7
9	5	2	8	3	5	6
4	2	6	8	1	3	5
1	5	9	2	4	2	3
9	4	6	3	1	8	5

(Let even numbers represent a win for team A and odd numbers represent a win for team B. Recall that 0 represents an even number for this purpose.)

What is the maximum number of games that could be played? ____

The probability that the series will end in 4 games is ____.
(Type an integer or a decimal.)

15.

Suppose you draw a card from a well−shuffled deck of 52 cards. Find each of the following odds.
What are the odds against drawing a 6?
What are the odds in favor of drawing a 6?
What are the odds against drawing a red queen?

What are the odds against drawing a 6?
[ ] : 1

What are the odds in favor of drawing a 6?
1 : [ ]

What are the odds against drawing a red queen?
[ ] : 1

16. Hint: Using a chart to show the sample space might help.

A pair of dice is rolled. What are the odds against rolling a sum of 5?

The odds against rolling a sum of 5 are [ ] to [ ].

17.

If the odds against Eagleton winning the election are 4 to 9, then what is the probability that Eagleton will win the election?

The probability that Eagleton will win the election is [ ].
(Simplify your answer. Type an integer or a fraction.)

18.

On a tote board at a race track, the odds for Gameylegs are listed as 30:1. Tote boards list the odds that the horse will lose the race. If this is the case, what is the probability of Gameylegs's winning the race?

What is the probability that Gameylegs will win the race?

19.

A sweepstakes posted the odds and payoffs. Suppose that mailing the sweepstakes costs $0.33 and the odds in favor of winning the various prizes are listed in the chart below.

Odds	Prize	Quantity
1 to 10000000	$2000000	1
1 to 10000000	$200000	10
1 to 5000000	$2000	100

What is the expected value of the sweepstakes for any individual?

$

(Round to the nearest cent.)

Considering the postage, is the drawing fair?

- Yes
- No

20. Hint: The Fundamental Counting Principle would definitely be helpful.

The eighth-grade class at a grade school has 9 girls and 12 boys. How many different boy-girl dates can be arranged?

boy-girl dates can be arranged.

21.

How many permutations are there of the letters in the word 'PENCILS', if all the letters are used without repetition?

The number of permutations is [ ].

22.

How many 5-person committees can be formed out of a class of 24 students?

In how many ways can a 5-person committee be chosen? [ ]

23. Consider here that the order of the 9-flag signal does matter.

Sally has 5 red flags, 2 green flags, and 2 white flags. How many 9 − flag signals can she run up a flag pole?

She can create [ ] signals.

24.

At a party, 66 handshakes took place. Each person shook hands exactly once with each of the others present. How many people were at the party?

There were ☐ people at the party.

25. The order in which the numbers are chosen does **not** matter.

What is the probability of winning a lottery in which you must choose 5 numbers from the numbers 1 through 16?

What is the probability of winning the lottery?

☐

(Type a fraction.)

Extra Credit:

The sales force of a business consists of 10 men and 10 women. A production unit of 7 people is set up at random. What is the probability that it will consist of 5 men and 2 women?

The probability is ☐.

(Simplify your answer. Type an integer or a fraction.)