

Math for Liberal Arts - Math 116
Final, May 1, Spring 2012

Name _____

Show all work and box your final answers. Good luck!

1. (a) (10 points) *Construct a Venn diagram to determine the validity of the given argument.*

- (i) All pesticides are harmful to the environment.
- (ii) No fertilizer is a pesticide.

Therefore, no fertilizer is harmful to the environment

(b) (5 points) *Fill in the blank with what is most likely to be the next letter.*

strawberry	asparagus	eggplant	broccoli
r	g	p	—

2. (a) (10 points) *Consider the symbolic representations given below.*

p: A person is an author.

q: A person is literate.

Translate the following sentence into symbolic form.

Being an author is sufficient for being literate.

(b) (10 points) *Consider the symbolic representations given below.*

p: The animal is a chimpanzee.

q: The animal is a monkey.

Translate the following sentence into symbolic form.

Not being a chimpanzee is necessary for being a monkey.

3. (a) (10 points) *Consider the symbolic representations given below.*

p: I sleep soundly.

q: I drink coffee.

r: I eat chocolate.

Translate the following sentence into symbolic form.

I do not sleep soundly if I drink coffee or eat chocolate.

(b) (5 points) *Form the the contrapositive of the given conditional.*

If you have the necessary tools, assembly time is less than thirty minutes.

4. (a) (10 points) *Express the contrapositive of the given conditional in terms of (i) a sufficient condition, and (ii) a necessary condition.*

Knowing CPR is necessary for being a paramedic.

- (b) (10 points) *Determine (i) the premise, and (ii) conclusion of the following statement.*

I eat raw fish only if I am in a Japanese restaurant.

5. (15 points) *For the argument, define the necessary symbols, rewrite the argument in symbolic form, and use a truth table to determine whether the argument is valid.*

No Frenchmen like plum pudding.

All Englishmen like plum pudding.

Therefore, Englishmen are not Frenchmen.

6. (20 points) *A consumer survey was conducted to examine patterns in ownership of microwave ovens, DVD players, and cellular telephones. The following data were obtained: 35 people had microwave ovens, 45 had DVD players, 55 had cell phones, 5 had all three, 10 had none, 25 had cell phones and DVD players, 10 had DVD players but no microwave ovens or cell phones, and 15 had microwave oven and cell phones but no DVD players.* (a) What percent of the people surveyed owned a DVD player? (b) What percent of the people surveyed owned only a DVD player?

7. (15 points) You order fourteen medium size hot beverages to go from Einstein Bros coffee shop, five with caffeine and nine without (that is, five regular coffees and nine decaf coffees). However, the restaurant forgot to label them. If you pick three beverages at random, find the probability of the given events: (i) At least two have caffeine; (ii) At most two have caffeine.

8. (a) (10 points) A softball league has eleven teams. If every team must play every other team once in the first round of league play, how many games must be scheduled?

(b) (10 points) *You are on a TV show. You have been asked to either play a dice game eight times or accept a \$50 bill. The dice game works like this:*

- *you roll a 2, you win \$60.*
- *If you roll a 1 or 3, you win \$18.*
- *If you roll a 4, 5, or 6, you lose \$20.*

Should you play the game? Use expected values and decision theory to justify your answer.

9. (20 points) *Three hundred people apply for three jobs. Ninety of the applicants are women.* (a) If three people are selected at random, what is the probability that all are women? (b) If three people are selected at random, what is the probability that two are women?

10. (15 points) *To study the eating habits of students at a local college, thirty randomly selected students were surveyed to determine the number of times they had purchased food at the school cafeteria during the last week. The following results were obtained.*

1 5 2 3 1 3 2 2 3 3
5 1 3 4 1 3 4 2 3 1
1 3 2 1 1 5 2 4 2 1

- (i) Organize the given data by creating a frequency distribution, (ii) Construct a pie chart to represent the data, and (iii) Construct a histogram using single-valued classes of data.