

HOMEWORK: PROBABILITY

PROBLEM 1:

Single Status and Microwave Ownership

	S (single)	S' (not single)	
M (own microwave)	40	360	400
M' (no microwave)	60	540	600
	100	900	1000

- What is the probability of owning a microwave?
- What is the probability of owning a microwave *given* that one is single?
- What is the probability of owning a microwave *given* that one is not single?
- Are microwave ownership and being single related?

PROBLEM 2:

In a study of marriages, researchers examined the faithfulness of men and the survival of the marriage. The results for 5,000 marriages were as follows:

	Faithful (F)	Unfaithful (F')	
Divorce (D)	1300	1200	2500
No Divorce (D')	1700	800	2500
	3000	2000	5000

If an individual man is selected at random, what is the probability that he or she

- is divorced?
- Is divorced *given* that he was faithful?
- is divorced and unfaithful?
- is divorced or faithful?
- Is there a relationship between beverage faithfulness and divorce?

PROBLEM 3: Tattoos and Marriage

A study of tattoos on women and marriage found the following:

	Tattoo (T)	No Tattoo (T')	
Married (M)	200	800	1000
Not Married (M')	300	400	700
	500	1200	1700

- Compute these probabilities: (a) $P(M \text{ and } T)$ (b) $P(M)$ (c) $P(M/T)$ (d) $P(M \text{ or } T)$
 (e) $P(T/M)$ (f) Is there a relationship between marriage and having a tattoo?

PROBLEM 4: (a) what if the probability of being a gum chewer or living in the Northeast? (b) Is there a relationship between region and gum chewing?

	Northeast	South	West
Chews Gum	100	70	130
Does Not Chew Gum	300	230	70

PROBLEM 5: PREFERENCE FOR CAN

(a) What is the probability of preferring a glass bottle? b) What is the probability of preferring a glass bottle *given* that one lives in Region B?

c) What is the probability of preferring a can *given* that one lives in Region C?

	Region A	Region B	Region C
Prefer Can	300	190	60
Prefer Glass Bottle	200	110	40

PROBLEM 6: Religion and Divorce

(a) What is the probability of being a Protestant? (b) What is the probability of being divorced? (c) What is the probability of being a divorced Catholic? (d) What is the probability of being divorced given that one is Jewish? (e) Is there a relationship between divorce and religion?

	Protestant	Catholic	Jewish
Been Divorced	400	200	100
Never Divorced	600	500	200

PROBLEM 7: Smoking and Gender

	M (male)	F (female)		
S (smokes)	150	130		280
S' (doesn't smoke)	250	470		720
	400	600		1000

- (a) $P(\text{male}) =$
- (b) $P(\text{female and smoker}) =$
- (c) $P(\text{female or smoker}) =$
- (d) $P(\text{male} \mid \text{smoker}) =$
- (e) $P(\text{smoker} \mid \text{male}) =$
- (f) Is there a relationship between gender and smoking?