Homework #5 Answers

23. Blood.

Since all of the events are disjoint (a person cannot have more than one blood type!), use the addition rule where applicable.

a)
$$P(\text{Type AB}) = 1 - P(\text{not Type AB}) = 1 - P(\text{Type O or Type A or Type B})$$

= 1 - (0.44 + 0.42 + 0.10) = 0.04

33. The train.

Assuming the arrival time is independent from one day to the next, the multiplication rule may be used.

- a) P(gets stopped Monday and gets stopped Tuesday) = (0.15)(0.17) = 0.0225
- b) $P(\text{gets stopped for the first time on } Thursday) = (0.85)(0.85)(0.85)(0.85)(0.15) \approx 0.092$
- c) $P(\text{gets stopped every day}) = (0.15) \approx 0.00008$
- P(gets stopped at least once) = 1 P(never gets stopped) = 1 (0.85) < 0.556

34. Voters.

Since you are calling at random, one person's political affiliation is independent of another's. The multiplication rule may be used.

- a) $P(\text{all Republicans}) = (0.29)(0.29)(0.21) \approx 0.024$
- b) $P(\text{no Democrats}) = (1 0.37)(1 0.37)(1 0.37) \approx 0.25$
- $P(\text{at least one Ind.}) = 1 P(\text{no Independents}) = 1 (0.77)(0.77)(0.77) \approx 0.543$

35. Religion.

Since you are calling at random, one person's religion is independent of another's. The multiplication rule may be used.

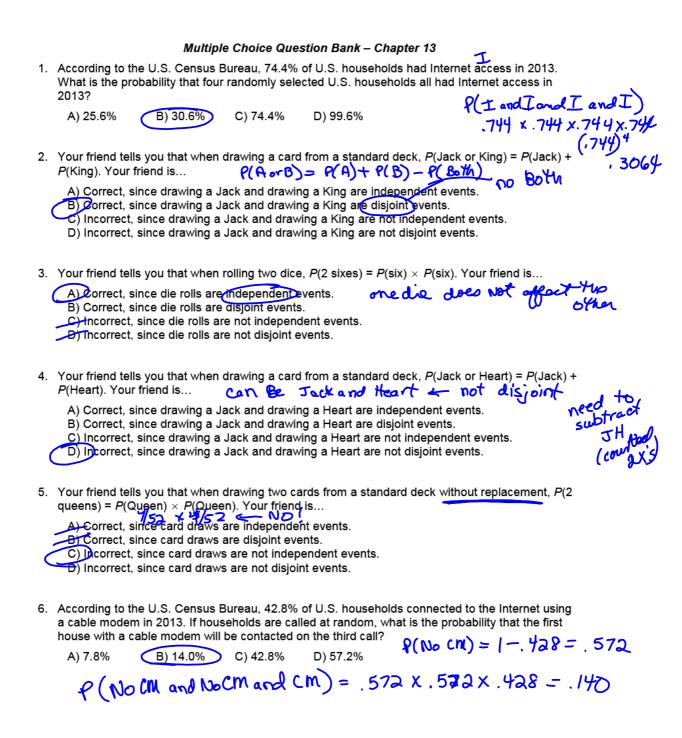
- a) $P(\text{all Christian}) = (0.62)(0.62)(0.62)(0.62) \approx 0.148$
- b) $P(\text{no Jews}) = (1 0.12)(1 0.12)(1 0.12)(1 0.11) \approx 0.600$
- P(at least one person who is nonreligious) = 1 P(no nonreligious people)

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= 1 - (0.90)(0.90)(0.90)(0.90) = 0.3439
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37. Pepsi.

Assume that the winning caps are distributed randomly, so that the events can be considered independent. The multiplication rule may be used.

 $P(\text{you win something}) = 1 - P(\text{you win nothing}) = 1 - (0.90)^6 \approx 0.469$



7. A probability model is simply a list of outcomes and the probability of each outcome. Which of the following probability models is NOT a legitimate probability model?

A)							
(')	Outcome	1	2	3	4		
	Probability	0.2 +	0.2	0.2	0.2	8	#1

B)	Outcome	1	2	3	4]
	Probability	0.25	0.25	0.25	0.25	= (

C)	Outcome	1	2	3	4	
	Probability	0.7	0.2	0.1	0 -	= 1

D)	Outcome	1	2	3	4	
	Probability	1	0	0	0 -	1

8. A probability model is simply a list of outcomes and the probability of each outcome. Which of the following probability models is a legit mate probability model?

A)						
,	Outcome	1	2	3	4	
	Probability	0.3	0.25 }	0.25	0.25 -	1.05 #1

B)	Outcome	1	2	3	4]	
	Probability	0.01	0.02	0.03	0.04	1	#1

C)	Outcome	1	2	3	4/
	Probability	0.2	0.3	0.6	- 0.1

D)	Outcome	1	2	3	4	
	Probability	0.2 +	0.25	0.35	0.2	- 1

Multiple Choice Question Bank - Chapter 13 - Key

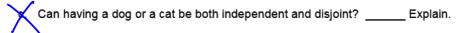
- 1) B
- 2) B
- 3) A
- 4) D
- 5) C
- 7) A
- 8) D

- A survey showed that 35% of households in a town have a dog and 12% of households have a cat.
 - a. Explain what it would mean if having a dog and a cat were disjoint events.

No both - can't have a cat and a dog.

b. Explain what it would mean if having a dog and a cat were independent events.

Having a cat or dog would not affect the probability of having the other.



d. Is it reasonable to use the Addition Rule to predict that 35% + 12% = 47% of the town's household have a dog or cat? No Why or why not?

Blc some families have both - counted twice.

 A friend claims that he is so sure that he will be accepted into the college of his choice that the probability is 110%. Comment on his claim.

He can't be more than 100% certain.

Name	Statistics Chapter 13: Review
	1/4 P(Wrong) = 3/4 = .75
1. Five multiple choice questions, each with four po What is the probability that if you just guess, you a. get none of the questions correct? **Real Wand Wand Wand W = ,	
b. get all of the questions correct? $P(R \text{ and } R \text{ and } R \text{ and } R) =$.25 x .25 x .25 x .25 x .25 = ,000 97656
c. get at least one of the questions wrong? 1 - P(5 R) - 100 = .99 2 c.+ b G. get your first incorrect answer on the fourth q	. 00
P(R,R,R,R,W)= .25x,25x.	25×.25×.75 = .003

- 2. Mars, Inc. manufactures bags of Peanut Butter M&M's. They report that they make 10% each brown and red candies, and 20% each yellow, blue, and orange candies. The rest of the candies are green.
 - a. If you pick a Peanut Butter M&M at random, what is the probability that

2. it is a primary color (red, yellow, or blue)? 10 + 30 + 20 = 50

3. it is not orange?
$$|-\Re(\text{orange})| = |-.20| = .80 = .80$$

b. What is the probability of choosing five of these candies from a large vat and getting all blue candies (show your work)?