

LPS/PHIL 31: Sample Final 1

Name: _____

Student ID: _____

Problem 1

(15 pts) Draw a truth table and use it to identify whether the following argument is valid: $k \& (m \vee c), \sim(k \& c)$, therefore $m \vee \sim k$.

Problem 2

(15 pts) [The actual final will ask one of the questions from the following list, and you will have to write a few sentences answering it.]

List of possible questions:

- Why does Hume think we can never have a deductive proof of the uniformity of nature?
- Why does Hume think an inductive argument for the uniformity of nature can never be convincing?
- What does it mean for an argument to be inductively strong, and how is this related to epistemic probability?
- What does it mean for an argument to be deductively valid, and how can truth tables be used to identify it?

Problem 3

For these questions, either calculate the desired probability, or state that not enough information is present.

1. (5 pts) If $Pr(k \& u) = .3$, then what is $Pr(\sim k \vee \sim u)$? _____
2. (5 pts) If $Pr(e) = .6$ and $Pr(e \& l) = .3$, then what is $Pr(e \& \sim l)$? _____
3. (5 pts) If $Pr(w) = .6$ and $Pr(x \vee w) = .8$, then what is $Pr(x \& w)$? _____
4. (5 pts) If $Pr(y) = .5$ and $Pr(i \vee y) = .7$, then what is $Pr(i \& \sim y)$? _____
5. (5 pts) If $Pr(s) = .6$ and $Pr(h) = .5$ and $Pr(\sim s \& h) = .2$, then what is $Pr(s \vee h)$? _____
 - (5 pts) Are s and h probabilistically independent? _____
2. (5 pts) If $Pr(q) = .5$ and $Pr(q \vee g) = .75$ and $Pr(q \& g) = .3$, then what is $Pr(g)$? _____
 - (5 pts) Are q and g probabilistically independent? _____
2. (5 pts) If $Pr(\sim r) = .2$ and $Pr(u) = .25$ and $Pr(u \& \sim r) = .05$, then what is $Pr(u \& r)$? _____
 - (5 pts) Are r and u probabilistically independent? _____

Problem 4

Fill in the probabilities of this truth table (5 pts) using the following information:

- $Pr(i) = .6$
- $Pr(j \mid i) = 1/2$
- $Pr(j \mid \sim i) = 1/4$
- $Pr(k \mid (i \& j)) = 1/3$
- $Pr(k \mid (i \& \sim j)) = 2/3$
- $Pr(k \mid (\sim i \& j)) = 1$
- $Pr(k \mid (\sim i \& \sim j)) = 2/3$

i	j	k	Pr
T	T	T	_____
T	T	F	_____
T	F	T	_____
T	F	F	_____
F	T	T	_____
F	T	F	_____
F	F	T	_____
F	F	F	_____

Problem 5

Two dice are about to be rolled. Each of the dice has probability $1/6$ of showing each of the numbers from 1 through 6, and the results of the two dice are independent. Calculate the expected value of each of these gambles:

1. (5 pts) +6 if the total is 4 or less, nothing otherwise. _____
2. (5 pts) +12 if the total is exactly 7, -36 if the total is exactly 12, nothing otherwise. _____
3. (5 pts) +6 if the total is odd, -2 if the total is even. _____
4. (5 pts) +9 if the two dice show the same number, -2 if the total is odd, nothing otherwise. _____

Problem 6

1. (10 pts) Jose is considering a trip to Rome (+20 if he gets to see the Pope, +5 otherwise) or a trip to Paris (+10 for sure). He decides to go to Paris. What can we say about how likely he thinks it is that he will get to see the Pope if he goes to Rome?
2. (10 pts) Cindy is writing a gift card for her nephew's birthday. She is 80% sure that his name is spelled "Dillyn". But she decides to call her brother to verify, to avoid the embarrassment of spelling it wrong. If calling her brother gives -1 utility (it's hard to get in touch with him in a different time zone), then how bad must she think the embarrassment would be?

Problem 7

A detective is considering hypothesis that the suspect fled by boat (b). Right now, she has $Pr(b) = .4$. The detective decides to go to the dock to look for clues. She thinks she might find the suspect's footprint there (f) — there is a moderate chance of finding a footprint that matches the suspect if he did ($Pr(f \mid b) = 1/4$) but also a small chance of finding a similar footprint otherwise ($Pr(f \mid \sim b) = 1/12$). She thinks the suspect might have taken his neighbor's boat if he fled, so the neighbor's boat would be missing (n ; $Pr(n \mid b) = 1/2$), but the neighbor might also have taken the boat out this morning even if the suspect didn't ($Pr(n \mid \sim b) = 1/5$).

1. (10 pts) What is $Pr(b \mid f)$? _____
2. (10 pts) What is $Pr(b \mid n)$? _____

3. (20 pts) If f and n are independent conditional on b and on $\sim b$, then what is $Pr(b \mid f \ \& \ n)$?
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