

Stat 185 - Review problems for Exam 1

Our first exam is this Friday, September 13. Here are a few problems to get you thinking. There's a good chance that *most* of these problems will be represented on the exam, though there is some overlap.

1. The data table below lists NBA players.
 - (a) What are the cases in the data table?
 - (b) Name one numerical variable.
 - (c) Name one nominal, categorical variable.
 - (d) Name one ordinal, categorical variable.

FirstName	LastName	Team	Position	Number	Height
Alex	Abrines	Thunder	Guard	8	78
Jaylen	Adams	Hawks	Guard	10	74
Steven	Adams	Thunder	Center	12	84
Bam	Adebayo	Heat	Center-Forward	13	82
DeVaughn	Akoon-Purcell	Nuggets	Guard-Forward	23	78

2. A random sample of registered voters from Tampa, FL were asked if they support the DREAM Act, a proposed law which would provide a path to citizenship for people brought illegally to the US as children. The survey also collected information on the political ideology of the respondents. The results of the survey by political ideology are shown below. They are also illustrated as a Mosaic plot shown in figure 1.

	<i>Political ideology</i>			Total
	Conservative	Moderate	Liberal	
Support	186	174	114	474
Don't support	151	161	52	364
Not sure	35	28	9	72
Total	372	363	175	910

- (a) What percent of these Tampa, FL voters support the DREAM Act?
- (b) What percent of these Tampa, FL voters who identify themselves as conservatives are also in support the DREAM Act?
- (c) Do political ideology and views on immigration appear to be independent? Explain your reasoning.

3. Consider the numeric data $\{1, 1, 2, 4\}$.
- Write down the computation showing that the mean is 2.
 - Write down the computation showing that the standard deviation is $\sqrt{2}$.
4. Suppose I draw a card from a well shuffled deck. What's the probability that
- It's the 7 of clubs?
 - It's a 7 or a club?
 - It's the 7 of clubs or the Jack of diamonds?
 - It's the 7 of clubs and the Jack of diamonds?
5. Suppose I roll a standard 6 sided die twice. What's the probability that
- The first roll is a 6 and the second roll is a four?
 - The first is less than 3 and the second roll is even?
 - The sum of the two die equals 3?
6. Suppose that X is a discrete random variable with the following distribution:

X	1	2	4
$P(X)$	1/4	1/4	?

- What should the ? be in order to make this a good probability distribution?
 - What is the expected value or mean of X ?
 - What are the variance and standard deviation of X ?
7. I've got an unfair coin that comes up heads 90% of the time. Suppose I flip the coin and write down a 1 if it comes up heads or a 0 if it comes up tails. Let's denote that numerical value by the random variable X .
- Write down the table that defines the distribution of X .
 - Compute $E(X)$, $\sigma^2(X)$, and $\sigma(X)$ - i.e. the mean, variance, and standard deviation.
8. Continuing with the previous problem that uses an unfair coin that comes up heads 90% of the time, now suppose I flip the coin 1000 times and count the number of heads that I get. We'll call that numerical value S .
- Compute $E(S)$, $\sigma^2(S)$, and $\sigma(S)$ - i.e. the mean, variance, and standard deviation.
 - Use a normal approximation to find $P(S) < 888$.

9. Figure 2 shows two normal curves, one of which is the standard normal curve.
- (a) Which curve is the standard normal?
 - (b) What is the mean of the other (non-standard) normal curve?
 - (c) Which of the following could be the standard deviation of the other (non-standard) normal curve: $-1/2$, $1/2$, or 2 ?
10. Let Z denote a random variable with the standard normal distribution. Use a table to compute
- (a) $P(Z < 1.8)$
 - (b) $P(-1 < Z < 1.8)$
 - (c) $P(Z > -1)$
11. Let X denote a random variable with a normal distribution with mean $\mu = 72$ and standard deviation $\sigma = 4.8$. Use a table to compute
- (a) $P(X < 78)$
 - (b) $P(70 < X < 82)$
 - (c) $P(X > 80)$

Figures

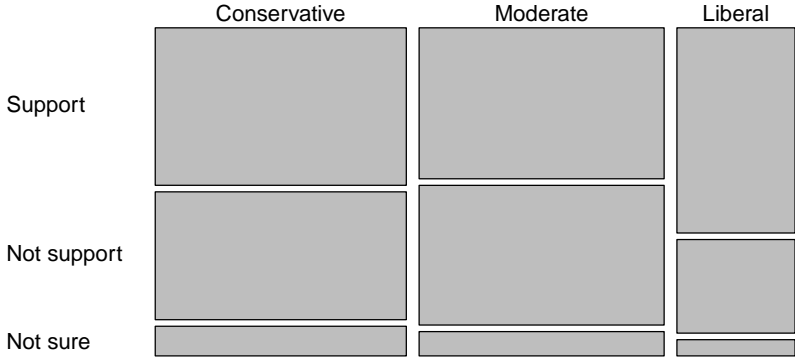


Figure 1: The Mosaic plot for problem 2

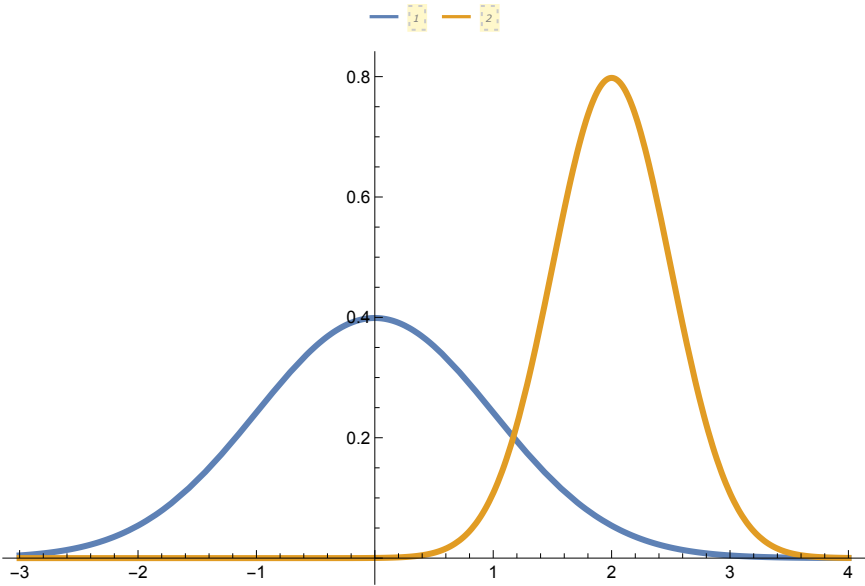


Figure 2: Two normal curves