

MATH 210, PROBLEM SET 7

DUE IN LECTURE ON WEDNESDAY, NOV. 3

1. Bayes Theorem

1. The Pew Research Center published on October 27, 2010, the results of a survey of attitudes about global warming. This can be accessed online via the link <http://people-press.org/report/669/>. One of the survey questions was:

“Is there solid evidence that the earth is warming.”

The percentage of Republicans answering “No” to this question was 53%. The percentage of Democrats answering “No” was 14%, while the percentage of Independents answering “No” was 31%. According to a Rasmussen report in September 2010, 33.1% of voters identify themselves as Republican, 34.6% identify themselves as Democrat, and 32.3% are Independent. Given that a voter does not believe there is solid evidence that the earth warming, what is the probability that they are Republican?

2. Describe an example from your own experience or in the news for which Bayes Theorem leads to the determination of a conditional probability which is of interest to you.

2. Random Variables

3. Suppose that two dice are rolled simultaneously. Let X be the random variable giving the absolute value of the difference of the two numbers which appear on the dice. Describe a sample space S for this problem. Assuming that the dice are fair, find $\text{Prob}(X = i)$ for all integers i .
4. Suppose that a dart player throws a dart at the unit disk in the x - y plane. The dart always hits the unit disk. The probability density function on the disk which is associated to where the dart hits has a value at (x, y) which is proportional to the distance of (x, y) from the boundary of the disk. Let X be the random variable giving the distance of where the dart hits from the center of the disk. Find $\text{Prob}(X \leq r)$ for all real numbers r such that $0 \leq r \leq 1$.