Review for Final Exam—MTH 245

**Topics**

Finding Sample Spaces: listing possible outcomes of an experiment  
 Flip two coins, the possible results: HH, HT, TH, TT

Flip two coins, how many heads? x = 0, 1, 2

Calculating probabilities & Probabilities using And / Or

P(E) = (# of ways E can happen)/(# of equally likely outcomes), can approximate with a large number of trials to get empirical probabilities.  
Using a table of values

Assigning Random Variables   
Define the sample space numerically…rather than HH use x = 2 to describe the event of 2 heads when flip two coins. Why? So we can Create Probability Distribution tables

|  |  |  |  |
| --- | --- | --- | --- |
| x | 0 | 1 | 2 |
| P(x) | .25 | .5 | .25 |

Creating Probability Distribution tables (Theoretical vs. Empirical)

to get empirical probability distributions can set up tables and use rand() and randbetween to simulate an outcome then run the experiment a large number of times (Data Table comes in handy here) and then use the Pivot Table to create a probability distribution of the results. (The area in the bar chart is the same as the values of the table, both are estimates of the theoretical probability)

If an experiment has two possible outcomes to each trial we can use the binomial distribution to get a theoretical probability distribution

Expected Value

Does it pay to gamble? In order to find expected value you need to know all of the possible outcomes and the probability of each of those possible outcomes. (That would be the information a probability distribution table has in it.) Expected value is the sum of the products of x\*P(x) for each value of x. SumProduct is useful.

Descriptive Statistics

Mean (which is Average in Excel), median, mode, range, quartiles, percentiles, standard deviation

Frequency distributions

Binomial Distributions

Normal Distributions

z-values

actual values