

**Math4020**  
**Another Probability Worksheet**

1. You will do a probability experiment with coins, as follows.
  - (a) Toss a coin four consecutive times, recording each toss (*or four different coins, like a nickel, penny, dime and quarter and then record the outcomes in the same order each time—like penny, nickel, dime, quarter outcomes*). Repeat this process 100 times. Keep a tabular record of all the toss results, and turn that log in with this homework. (For example, your first 4 results might be TTTH, TTHT, HTHT, HHHT.)
  - (b) Compute the experimental probability of each of the following events (out of your 100 recorded results).
    - A: There are exactly 2 tails
    - B: There's an even number of tails
    - C: There are no tails at all
    - D: There is either exactly 1 head or exactly 4 heads
  - (c) Write up the sample space for four coin tosses (either in a set/list form or in a tree—for theoretical probability). Compute the theoretical probability of the events A-D listed above.
  - (d) Use Pascal's Triangle to determine the theoretical probability of events A-D listed above. Show enough work or explain what you did. (*Note: If done correctly, your results for (b) and (c) should match.*)
  - (e) Make a table that compares the probabilities for events A-D. List your experimental probability in one column and the theoretical probability in another column. Discuss how the experimental probability compared to the theoretical probability for each event and what might account for the differences, if there are any.
  
2. In a class of 33 people, 14 people have blue eyes (B), 12 people have blond hair (H) and 7 people have both blue eyes and blond hair.
  - (a) Draw a Venn diagram representing this data.
  - (b) Use the Venn diagram to help you determine the following probabilities.
    - (i)  $P(H \cup B)$
    - (ii)  $P(H \cap B)$
    - (iii)  $P(\overline{H \cup B})$
    - (iv)  $P(\overline{H \cup B})$