Counting: Systematic Listing

1. A fair coin is tossed three times in a row.

    (a) Construct a tree diagram of all the possible results.

    (b) List the ways of getting no more than two heads. ttt,htt,tht,tth,hht,hth,thh

    (c) List the ways of getting more than two heads. hhh

    (d) How many possible outcomes are there? 8

    (e) If the coin is tossed again, how many possible outcomes would there be? 16

2. You are getting ready for a job interview and you want to make sure you look your best. You have 2 pairs of shoes you could wear, 3 pairs of pants, and 4 shirts you could wear.

    (a) How many outfits could you wear? 24

    (b) You realize that your dog has eaten one pair of your shoes. How many outfits are possible given this new information? 12

3. The UH Math Club is electing new officers. The eligible members of the club are $\{Ben, Chris, Kaila, Harrison, Marsha, Lee\}$. List and count the ways the club could elect each group of officers. Note that Chris, Kaila, and Lee are the only eligible senior members.

    (a) President 6

    (b) Treasurer and President 30

    (c) Treasurer and President and the President must be a senior.15

    (d) Treasurer and President and exactly one position must be a senior.18

    (e) Treasurer and President and at least one position must be a senior.24

4. Draw a five pointed star with 5-lines. (This isn't a trick, just draw a star with *straight* lines.) Systematically list, and count, the number of triangles of any size in the star. 10