Some counting questions

Math 10120, Spring 2013

January 30, 2013

The Hoosier Lottery

When you buy a Hoosier Lottery ticket, you select 6 numbers from among the numbers 1 through 48. How many different lottery tickets can you buy?

Poker hands

A poker hand consists of a selection of 5 different cards from an ordinary deck of 52 cards. How many different poker hands are there?

An ordinary deck has 4 suits (hearts, clubs, spades, diamonds). In each suit there are are 13 cards (Ace, 2 through 10, Jack, Queen, King). How many poker hands involve cards from just a single suit?

Notre Dame Hockey

Notre dame hockey has a 26-man roster, of which exactly three are goaltenders. Each game day, Coach Jeff Jackson has to choose

- 21 players to suit up, exactly two of whom must be goaltenders
- 6 of those players to start, exactly one of whom must be a goaltender
- the order of pre-game announcement of the six starters, with the goaltender announced last.
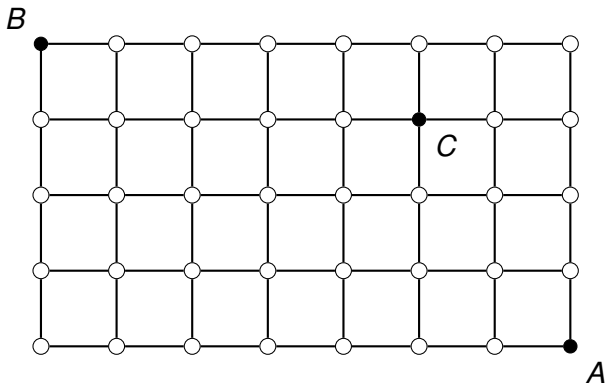
How many options does he have in total?

Tossing a coin

I toss a coin 15 times, and record whether I got a head (H) or a tail (T) each time. How many different total outcomes could I record?

In how many of these outcomes do I record between 5 and 10 tails?

In how many of these outcomes do I record at least 2 tails?

Traveling through Manhattan

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How many ways to walk from *A* (first and first) to *B* (fifth and eight), if you only walk west and north (so always walk 11 blocks, with each block taking you closer to your final destination)?

How many ways to walk from *A* to *B*, if you have to pass through *C* on the way (and again you only walk west and north)?

Pulling maltballs out of a goblet

A goblet has 13 maltballs (6 green and 7 red). In how many ways can I select 5 maltballs from the goblet?

In how many ways do I end up with 5 maltballs, all of the same color?

In how many ways do I end up with 1 red and 4 green?

In how many ways do I end up with at least 3 green?

Which students do I pick?

Ten students come to my office hours. I decide to answer the questions of some subset of them (including maybe no-one, or maybe everyone). How many different subsets of the ten students can I select?