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Administrivia

- “Useful links” page updated with link to interesting math-puzzles site.

Slide 2

Permutations

- We might want to know how many ways we can choose an ordered sequence of r objects, chosen from n possibilities with no repeats. Call this $P(n, r)$.
Example: How many 7-digit phone numbers have no repeated digits?
- Can we come up with a general formula? (Of course. Let's derive one.)
- Look at some boundary cases — $r = n$, $r = 0$, $r = 1$, etc. (We'll need to agree that $0! = 1$.)

Combinations

- Or we might want to know how many ways we can choose an *unordered* collection of r objects, chosen from n possibilities with no repeats. Call this $C(n, r)$.

Example: How many ways can we draw 5 cards from a deck of 52?

Slide 3

- Can we come up with a general formula? (Of course. Let's derive one.)
- Again look at some boundary cases — $r = n, r = 1, r = 0$.
- (Another common notation for this is $\binom{n}{r}$ (“ n choose r ”).)

Permutations Versus Combinations

- In general: If order matters, it's a permutation; if order doesn't matter, it's a combination.
- Example: How many 5-card “hands” of only face cards can we draw from a standard 52-card deck?
- Example: Section 3.4 problem 51.

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Potential Pitfall — Counting Things Twice

- A problem is that some proposed solutions sound reasonable but actually manage to count some things twice, or don't count some things at all.
- Example: example 55 part (d).

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Minute Essay

- None — quiz.

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