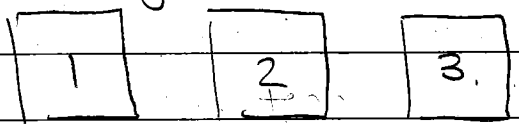
Turning Books in Friday – Need books TODAY

5.3 Trees and Counting Techniques

Intro Monty Hall Problem



Choose a door. One door has a car. Other 2 are goats.

- Probability of getting it right on the first try = $\frac{1}{3}$
- Monty Hall would show one of the goats
  Do you switch or stay? Discuss

Time Permit: Experimental 3 cards

Solution: Switch every time
Staying: probability remains $\frac{1}{3}$
Switch: probability concentrates to $\frac{2}{3}$

Tree Diagram - displays outcomes of an experiment

Example 1 Guided Exercise 10 pg. 194
Tree Diagram w/o probabilities

w/o Books

Example 2 (A) Example 8 pg. 198 - Probabilities w/o replacement
(B) Guided Ex 11 pg. 196 - Prob. w/ replacement

Multiplication Rule of Counting - If event E_1 has n possible outcomes and event E_2 has m possible outcomes, there are a total of nm outcomes for the series of events E_1 followed by E_2.
(Rule extends to multiple outcomes)

Example 3 (A) Decisions need to be made on Graduation announcements. Choices (# of options) include type of fold (2), font (5), color (4) and seal (6). How many total combinations do you have to choose from?

$2 \cdot 5 \cdot 4 \cdot 6 = 240$ options

(B) Six individuals are going to a movie. How many different ways can they sit in a row?

$6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 6! = 720$

Factorial $n!$

Permutations & Combinations

Permutations - order matters ${}_nP_r$

$$nP_r = \frac{n!}{(n-r)!}$$

Combinations - order does not matter ${}_nC_r$

$$nC_r = \frac{n!}{r!(n-r)!}$$

Discuss: examples of combinations vs permutations

Calculator: Math | Prob ${}_nC_r$; ${}_nP_r$