

Mat 116: Business Math

- Go over syllabus
- Go over my background and resume
- Website: www.seattlecentral.edu/faculty/langel
- My email: langel@u.washington.edu
- Anyone adding?
- Today: Chapter 1, maybe...

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Section 1-1: Business Background

- A bank is a financial intermediary through which savers can indirectly provide funds to borrowers.
- Take deposits from people who want to save and use the deposits to make loans to people who want to borrow (investors).
- Biggest issue for banks: Whom to lend?

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Section 1-2: Class Project

- If borrower fails to make expected payments, what should the bank do?
 - Foreclose: Bank takes over and sells asset.
 - Loan work out: Set up new plan or defer payments.
- How does a bank decide?
 - Use data from previous clients to ascertain the probability of success or failure.
 - Each group will be assigned a client deciding whether to foreclose or loan work out.

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Section 1-3: Group Project

- 5 minute Presentation
 - Introduction
 - Introduce client
 - Background
 - Conclusion (workout or foreclose)

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Chap 2: Set Theory

- **Definitions:**
 - A Set is a group of things.
 - An Element is a member of a set.
 - Set Theory is the study of sets.
 - See Notation, Example 1 & 2 in booklet.

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Section 2-2: Combining Sets

- **Combining Sets:**
 - Compliment (“insert symbol”): A^c means the set of all elements which are not in set A.
 - Union (“insert symbol” or “or”): $A \cup B$ means the set of all elements which are in set A or in set B.
 - Intersection (“insert symbol” or “and”): $A \cap B$ means the set of all elements which belong to set A and set B.
- See Example 1 & 2

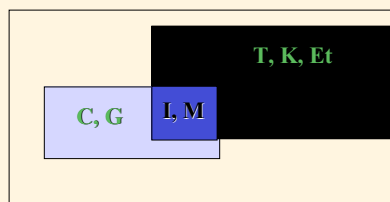
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Section 2-4: Venn diagram

- Venn diagram: useful tool for visualizing sets.
- Example:
 - Let $A = \{\text{Alice likes}\} = \{C, G, I, M\}$
 - Let $B = \{\text{Ben likes}\} = \{I, M, T, K, Et\}$
- Draw Venn Diagram

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Venn diagram



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General Counting Formula

If A and B are two events that are not mutually exclusive, then $P(A \text{ or } B)$ is given by the following formula: The important difference is mutual exclusive.

In my Bus 210 class, this is known as the General Rule of Addition

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

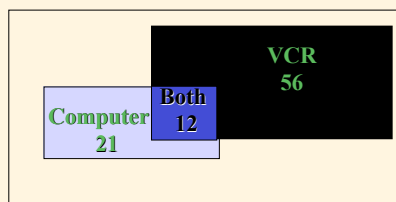
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2-7: Avoid Double-Counting Error

- Example 1:
 - Survey 100 households
 - 21 have computer
 - 56 have VCR
 - 12 Both
- Find the “union”, “or” of $C \cup V$?

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Venn Diagram



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DCOUNT and Set Theory

- 2-9 & 2-10
- Need Excel files

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Chapter 3: Probability

- **Probability** is the proportion of times a particular event will occur, usually represented by P.
- **Trial** is an activity where the result is unknown. This is sometimes called an experiment.
- **Outcome** is one specific result of a trail.
- **Sample space** is the set of all possible outcomes, usually represented by a capital S.

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Probability Example

A couple wants two children

- Trail is the have the two children
- Outcome is unknown, number of possibilities
 - Oldest child girl, second one boy or vice versa
 - Girl, Girl
 - Or Boy, Boy
- Thus sample space for this trail is all the possible outcomes. 4 in this case.
 - $S = \{gg, gb, bg, gg\}$

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Theoretical Formula for Probability

Let E be an even. Then:

$$P(E) = k/n$$

k = the number of ways event E can occur.

n = the total number of possible outcomes.

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Applying Probability Formula

- New England Commuter Airways recently supplied the following information on their commuter flights from Boston to New York: What is the probability the plane will arrive late?

Arrival	Frequency
Early	100
On Time	800
Late	75
Canceled	25
Total	1000

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Combining Events

- New England Commuter Airways recently supplied the following information on their commuter flights from Boston to New York: What is the probability the plane will arrive late or early? Remember counting formula: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

Arrival	Frequency
Early	100
On Time	800
Late	75
Canceled	25
Total	1000

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Combining Events Examples

- P. 45, Example 1 (a through d).
- Section 3-3: Dice Problems, example 1 and 2.
- Disjoint Events (Mutually Exclusive):
 - Events A and B are disjoint if they cannot happen at the same time.
 - Example: If drawing one card from a deck of 52, is it possible to draw a club and a spade. Nope! Thus, events are disjoint or mutually exclusive.

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Rules of Probability

Let A and B be events:

- Rule 1: $0 < P(A) < 1$
- Rule 2: $P(S) = 1$
- Rule 3: $P(A^c) = 1 - P(A)$
- Rule 4: If A and B are disjoint, the $P(A \cup B) = P(A) + P(B)$

Examples 1 & 2 (p. 51-52)

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