

# **Mathematical Methods for International Commerce**

**Week 1, Meeting 1: Course Introduction**

**Igor Vyshnevskyi, Ph.D.**

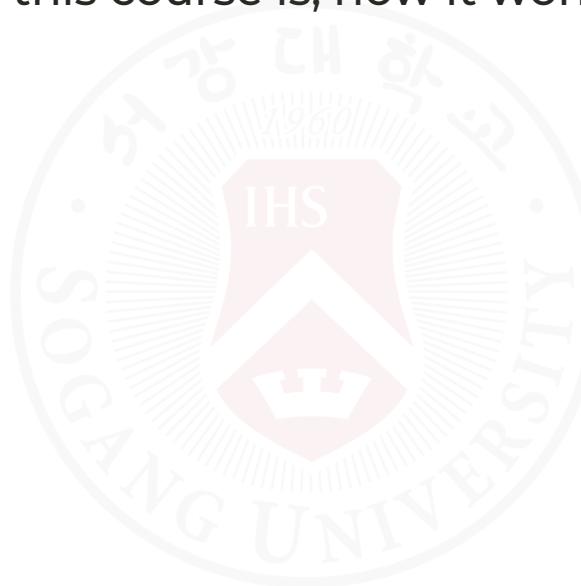
**Sogang University, Geppert School of International Studies**

**March 3, 2026**

Hello everyone!

I am *Igor Vyshnevskyi*, your instructor for **Mathematical Methods for International Commerce**.

In Week 1 we will focus on what this course is, how it works, and where the math shows up in international commerce.



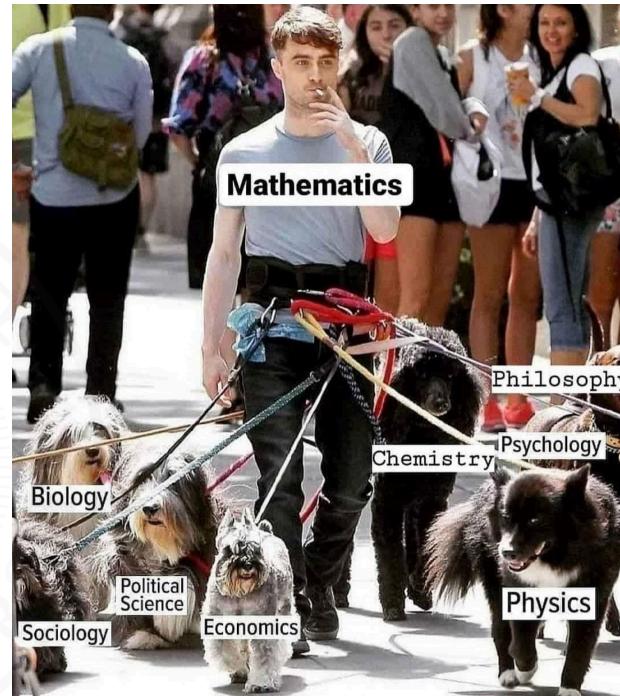
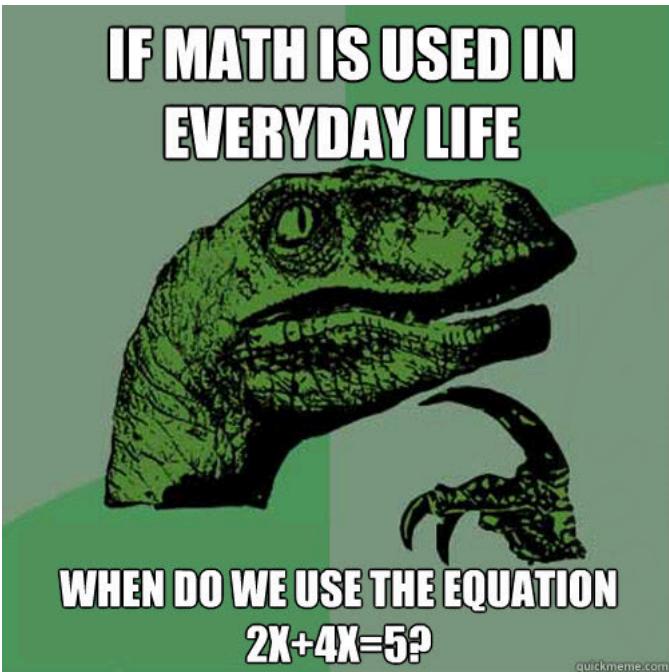
# Quick Icebreaker

On a scale from 1 (😢) to 5 (😍), how do you feel about math?

Please vote [here](#).



# Math in Our Life?



Source: Internet Memes

# Agenda

1. Introduction
2. Course Overview
3. What is Mathematical Methods for International Commerce ?

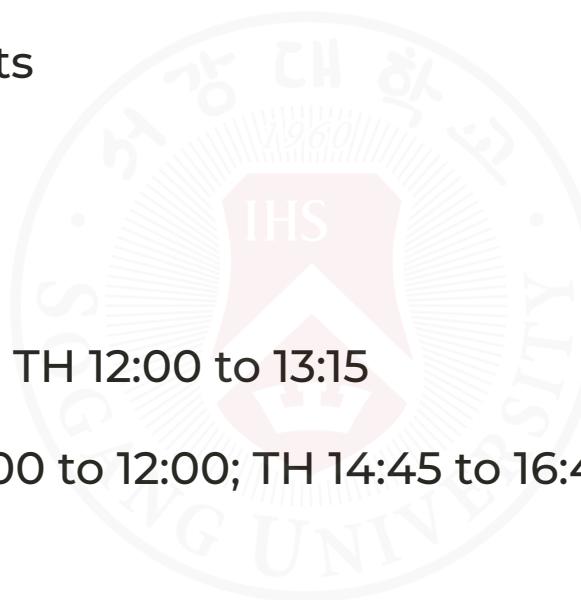


# 1. Introduction



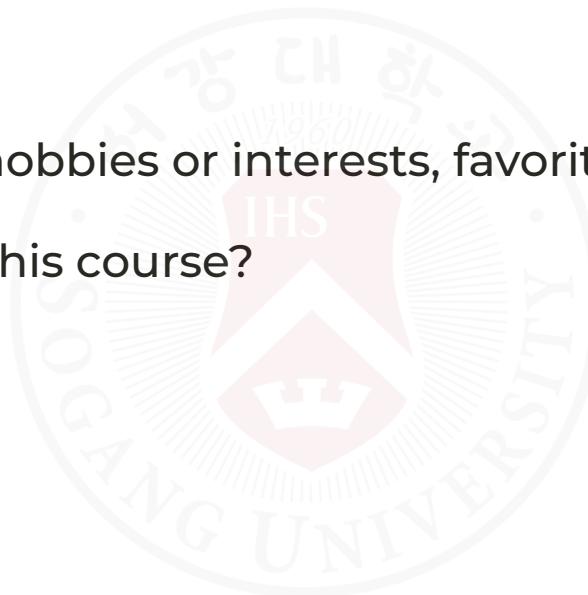
## Course Information

- **Course Title:** Mathematical Methods for International Commerce (TIS1005)
- **Course Credit:** 3
- **Designed for:** 1st-year students
- **Course Prerequisites:** None
- **Semester:** Spring 2026
- **Meeting Venue and Time:** TU, TH 12:00 to 13:15
- **Office Hours:** J721, TU, WE 10:00 to 12:00; TH 14:45 to 16:45 or by appointment



# Introductions

- Let's start with a little introduction:
  - What's your preferred name?
  - Where are you from?
  - Any fun fact to share (e.g. hobbies or interests, favorite quote, e.t.c.)?
  - What do you expect from this course?



# About me

My name is legor Vyshnevskyi.

- Assistant Professor ([link](#)), Sogang University
- Background: International banking & central banking
- Research interests: central banking, computational data science

Some Info:

- email: ievysh@sogang.ac.kr
- office: J721
- Communication preference:
  - LMS for most Q and A
  - Email mainly for meeting requests and urgent issues
- [My page](#)
- *Hobbies*: research, martial arts, cycling, etc.

# Disclaimer

- This course may be adjusted during the semester depending on class progress and learning needs.



## 2. Course Overview

# Course Description:

- **Designed for Incoming Students:** Builds essential mathematical foundations needed for success in international economics, business, and financial studies.
- **Core Topics Covered:** Introductory algebra, differentiation, matrix analysis, and optimization—building a strong foundation for analytical decision-making in the global economy.
- **Applied Focus:** Emphasizes practical problem-solving and economic applications over abstract mathematical theory.
- **Engaging Approach:** Demonstrates that mathematics is both a powerful analytical tool and genuinely enjoyable to learn.

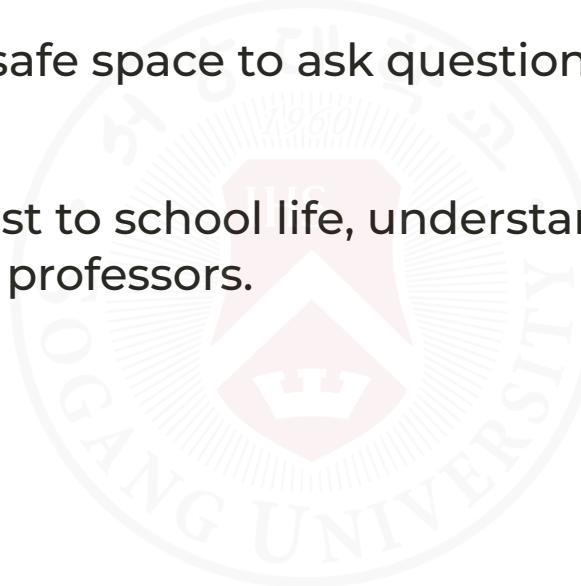
# Course Objectives:

By the end of this course, students will be able to:

- **Visualize Economic Relationships** – Use graphs and functions to understand market behavior and economic trends.
- **Solve Real-World Problems** – Apply linear and nonlinear equations to supply & demand, pricing, and investment scenarios.
- **Analyze Marginal Changes** – Use differentiation to understand rates of change in revenue, cost, and economic indicators.
- **Optimize Economic Decisions** – Maximize profits and minimize costs using comparative statics and partial differentiation.
- **Model Economic Growth** – Apply integration to analyze accumulation and economic modeling.
- **Solve Complex Systems** – Use matrix algebra to analyze interdependent economic relationships and policy effects.
- **Think Mathematically** – Develop logical reasoning and problem-solving skills applicable across economics, finance, and business.

# The Course in a Nutshell

- **Mathematical Foundations** – Learn the essential math skills needed for economics.
- **Hands-On Learning** – Apply concepts through class activities and home assignments.
- **Supportive Environment** – A safe space to ask questions, discuss, and learn from mistakes.
- **Beyond the Classroom** – Adjust to school life, understand Korean culture, and connect with classmates, seniors, and professors.



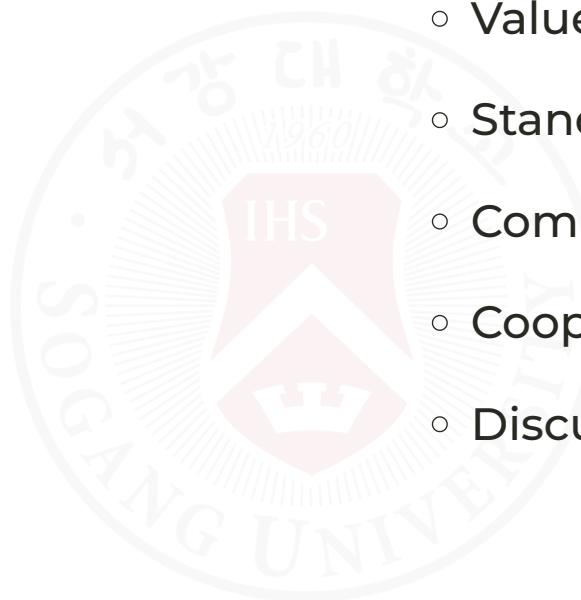
# Broad coverage

- **Formal/core curriculum:**

- Concepts
- Understanding
- Real-life cases
- Problem-solving
- Application

- **Hidden curriculum:**

- Values
- Standards
- Communication
- Cooperation
- Discussions

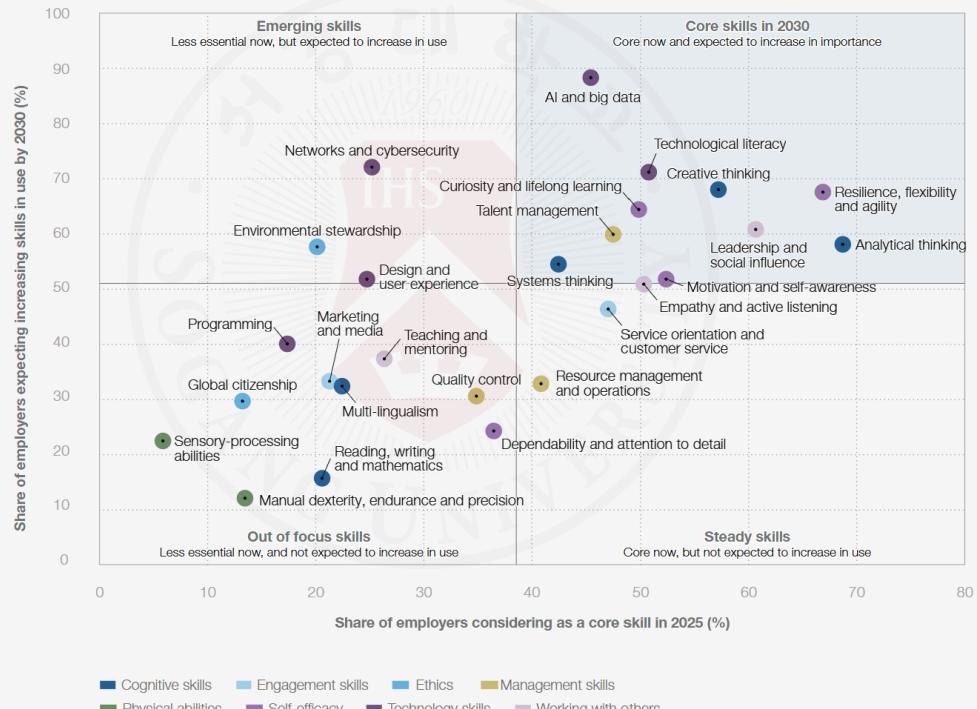


# Skills you will learn

Return on skills is higher than return on knowledge.

FIGURE 3.6 Core skills in 2030

Share of employers considering skills to be a core skill in 2025 and share of employers expecting skills to increase in importance by 2030.



Source

World Economic Forum, Future of Jobs Survey 2024.

Note

The Future of Jobs Survey uses the World Economic Forum's Global Skills Taxonomy.  
Bold lines represent the median values across all skills.

# Teaching method

The course uses a flipped classroom approach with lectures, in-class activities, and hands-on demonstrations to reinforce learning.

Typical cycle:

- Pre-class preview video under 15 to 20 minutes plus a short individual task (Cyber Campus)
- In-class lecture plus in-class activities
- Post-class problem set (5 to 10 short questions)
- Support sessions before quizzes and exams

# Course materials:

- Lecture notes
- Jacques, Ian (2023) **Mathematics for Economics and Business**, 10th ed., Pearson. Any previous edition would be also fine.



# GRADING

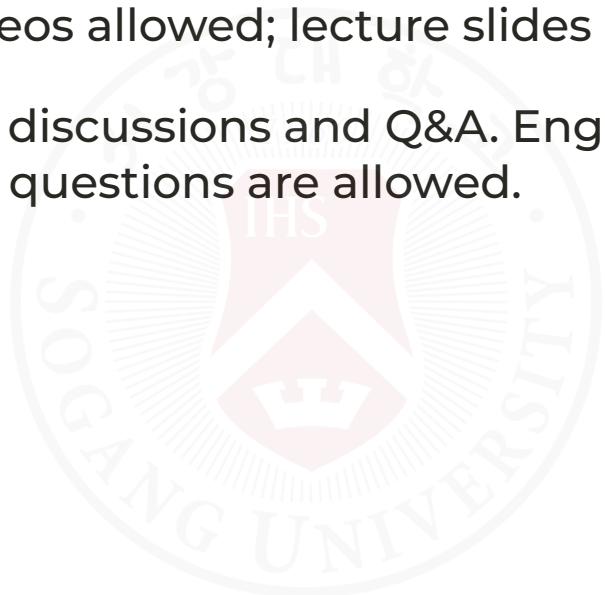
- *Class Participation*: 10%
- *Home Assignments*: 10%
- *Quizzes*: 30%
- *Midterm Examination (Week 8)*: 25%
- *Final Examination (Week 16)*: 25%
- **Total**: 100%

More details on each item you will get down the road.

*Remember, I'm not giving you grades; you're earning them.*

# Course Policies

- **Academic Integrity:** The University's Honor Code and Academic integrity will be strictly reflected. Plagiarism results in zero credit and an F-grade for the course.
- **Class Policy:** No photos or videos allowed; lecture slides are provided before class.
- **Communication:** Use LMS for discussions and Q&A. Engage early to benefit from collective knowledge. Private questions are allowed.



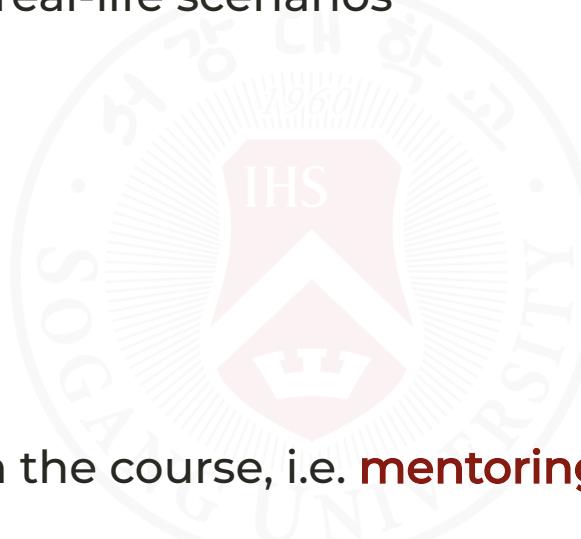
# Course roadmap

Week	Topic
Week 1	Course Introduction: Why study mathematics? Basic Algebra.
Week 2	Graphs of Equations, Solving Equations, Supply & Demand, Transposition of Formulae, National Income Determination.
Week 3	Quadratic Functions, Revenue, Cost & Profit, Indices & Logarithms, Exponential & Natural Log Functions.
Week 4	Percentages, Compound Interest, Easter Holiday, Geometric Series, Investment Appraisal
Week 5	Derivative of Functions, Rules of Differentiation, Quiz #1
Week 6	Marginal Functions, Further Rules of Differentiation, Elasticity
Week 7	Optimization of Economic Functions, Derivatives of Exponential & Natural Log Functions
Week 8	Mid-term
Week 9	Functions of Several Variables, Partial Elasticity & Marginal Functions
Week 10	Comparative Statics, Unconstrained Optimization
Week 11	Constrained Optimization, Lagrange Multipliers
Week 12	Indefinite Integration, Definite Integration
Week 13	Quiz #2, Basic Matrix Operations, Matrix Inversion
Week 14	Cramer's Rule, National Holiday (Memorial Day), Linear Programming
Week 15	Applications of Linear Programming, Difference Equations, Differential Equations
Week 16	Final Exam

Tentative schedule. It may be adjusted based on the class background and progress.

# General things

- Our Goals:
  - to learn the basics of Mathematical Methods for International Commerce
  - to apply the knowledge in real-life scenarios
  - see that *Math* is **fun** :-)
- Our Principle:
  - learning by doing
  - mutual respect
  - put one's efforts
- My role: to guide you through the course, i.e. **mentoring and facilitating**
- Your suggestions are welcomed and appreciated to make the course better for you and future students.



# Our communication

- Check the website regularly for materials and messages
- Feel free to approach me before or after our class
- **Office hours:** J721, Tu10-12, W10-12, Thu3-5 or by appointment. You are welcome to discuss course-related issues and questions, career plans, etc.
- Check / use **LMS** (incl. messages in-there)
- **Emailing policy:** email me to set up a one-to-one meeting or in the case of some urgent issues.
  - Please indicate the course name in the subject line and the issue (e.g., *[Mathematical Methods for International Commerce] Meeting request*)
  - Please write at least two times when you would like to meet and a brief description (1-2 sentence) why you want to meet up with me
  - I may not reply on time (so email me in advance)

# Course Overview

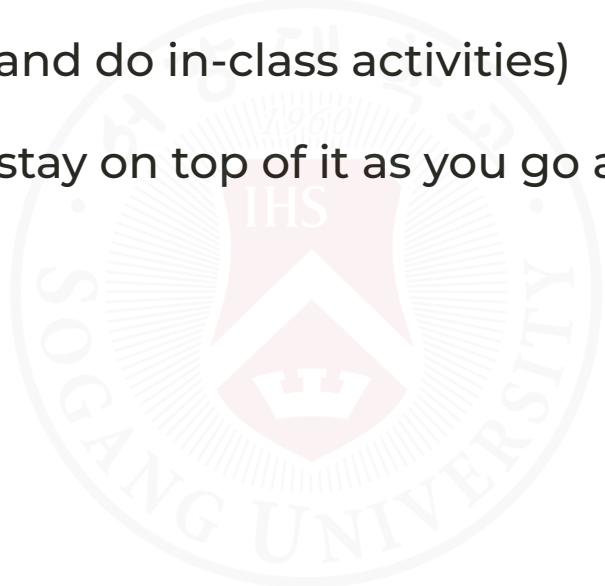
## Questions?

- Any questions about the course?
- Any questions about the syllabus?



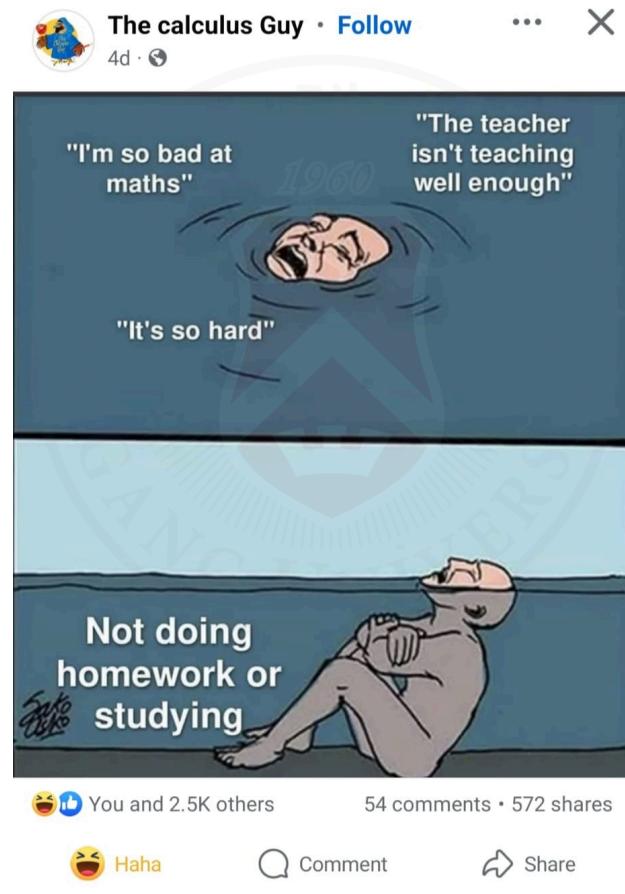
# Study Suggestions

1. Reading materials before class
2. Participate (10% of your grade) and ask questions.
3. Be active in class (don't miss and do in-class activities)
4. "The best way to learn ... is to stay on top of it as you go along. The worst way is to cram the night before exams." (c)



# Study Suggestions

## How to succeed in this course?



# Common Challenges Students Face

1. Lack of Interest
2. Language Barrier
3. Personal Challenges
4. Math Anxiety / PTSD



Based on Gaston Sanchez' [lectures](#)

## 1. Lack of Interest

- Great indifference
- Missing lectures
- Coming/leaving late/early
- No in-class activities
- Doing something else in class
- Cheating / free riding

**DROP IT**

## 2. Language Barrier

- Trouble with listening/reading comprehension
- Poor vocabulary
- Hard time with new terminology

**It's okay, just push harder**

No worries; it's not a language class.

Please use some online speech/voice translation tools to help you like **Online Voice Translator** or any others.

### 3. Personal Challenges

- Health
- Family
- Job
- Universe against you

Come talk to me ASAP

### 4. Math Anxiety / PTSD

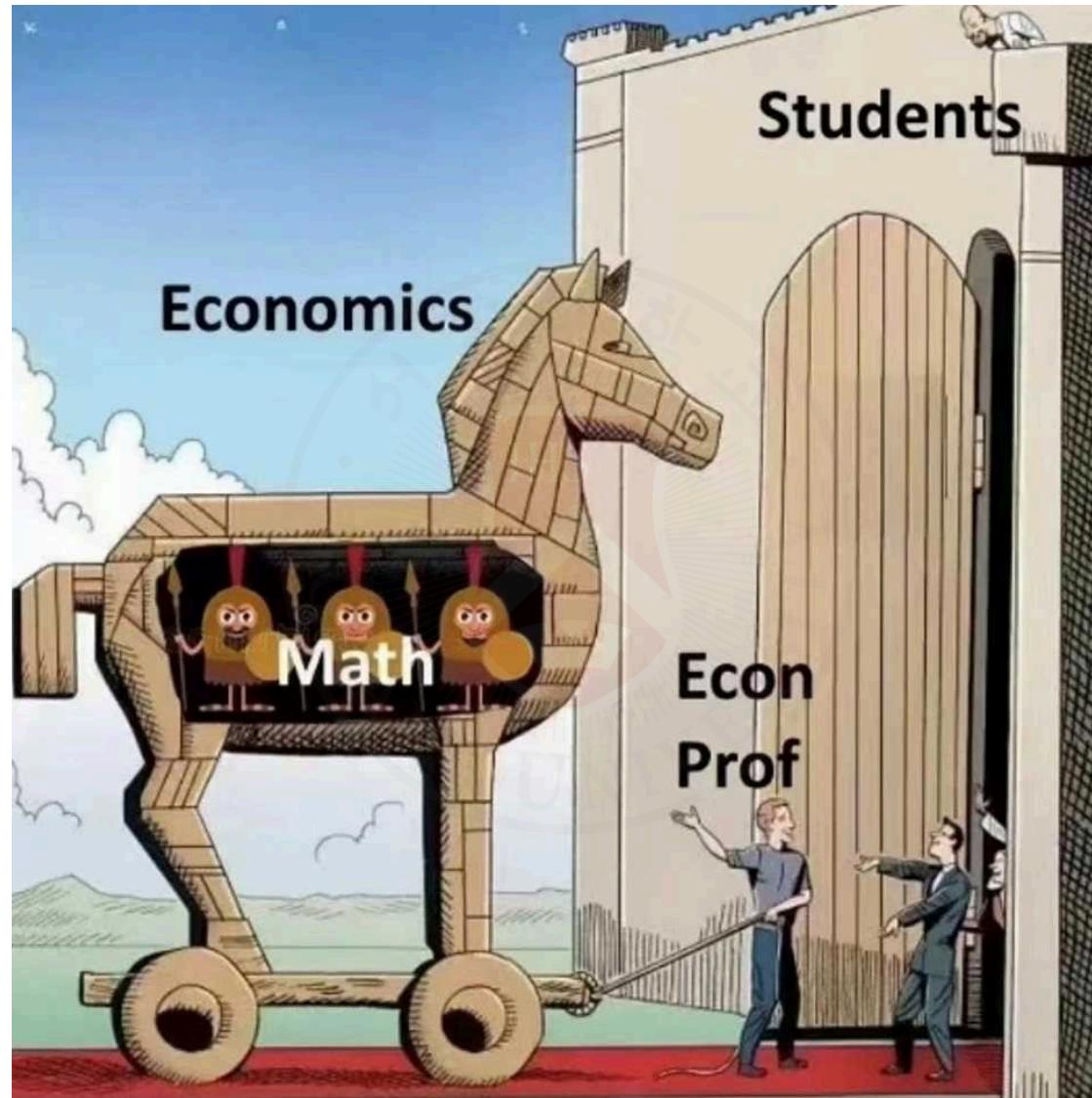
- Traumatic math experiences
- Can't operate numbers
- Don't see econ linkages

Just patience & work harder, give it a try



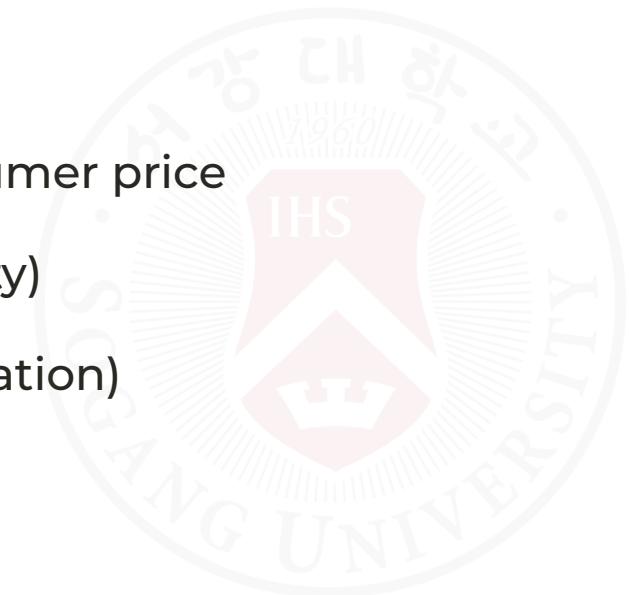
### **3. What Is Mathematical Methods for International Commerce?**

# Why Mathematical Methods for International Commerce?



# What does international commerce measure every day?

- Exchange rates and returns
- Price differences across countries
- Shipping and logistics costs
- Tariffs, taxes, and final consumer price
- Demand responses (elasticity)
- Risk (hedging and diversification)



# Why study Mathematical Methods for International Commerce?

- *Clarity & Precision* – Translates complex economic concepts into rigorous, logical models that eliminate ambiguity.
- *Better Decision-Making* – Helps analyze and solve real-world economic problems.
- *Stronger Analytical Skills* – Enhances problem-solving and critical thinking.
- *Career Advantage* – Essential for finance, business, policy analysis, and research.
- *Foundation for Advanced Studies* – Prepares for econometrics, optimization, and economic theory.

# Example 1: Exchange rate pass-through in one picture?

## Simple Example:

If a product costs \$100 USD and the exchange rate changes from 1,200 to 1,350 KRW/USD:

- Old price:  $\$100 \times 1,200 = 120,000$  KRW
- New price:  $\$100 \times 1,350 = 135,000$  KRW
- Price increase: 15,000 KRW or 12.5% increase in KRW price.

**The Math:**  $P_{KRW} = P_{USD} \times E_{rate}$

You already used algebra!



Any QUESTIONS?

Thank you for your attention!

# Next Class

- (Mar 5) Basic Algebra (1.1, 1.2)
- **Pre-class Preparation:** Watch the preview video (15-20 min) and complete the short task on the understanding check slide in Cyber Campus.
- **In-class:** Lecture, discussion, and group activities.

