Math Practice For Economics Answer Key

NAME _____ DATE _____ CLASS _____

Math Practice for Economics

networks

Analyzing an NYSE Euronext Listing

Investors follow changes for various stocks to determine which ones to invest in. Each day, information about each company's stock is released by the stock exchanges. Often, this information is organized in a table. It is important for investors to be able to analyze the table in order to make wise investment decisions.

Directions: Examine the chart below and then answer the following questions. If you need help with the terms, reread the section on stocks in Lesson 3.

52 weeks Hi	52 weeks Lo	STOCK (SYM)	DIV	YLD%	PE	100s	LAST	NET CHG
80.01	29.66	*Acme Quality (AQ)*	0.40	1.00	34.02	651	81.96	0.24
65.96	53.60	*ExxonMobil (XOM)*	1.28	2.13	10.25	25,966	61.18	-1.78
120.01	86.81	*Redex Corp (RDX)*	2.32	3.30	20.31	3,975	109.92	-5.91
71.48	6.15	*Ford Motor (F)*	0.80	5.79	9.0	75,168	6.97	-0.21

1. Examine column PE. The 10.25 for ExxonMobil tells us that an investor would have to buy $10.25 of stock to get $1 of current earnings. Would it be a better deal or a worse deal to buy shares of Redex Corp? Why?

2. Examine the column labeled "100s." This column tells how many hundreds of stocks were traded that day. Which stock was the most traded? Which stock was the second most traded?

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Math practice for economics answer key is an essential resource for students, educators, and anyone interested in mastering the quantitative aspects of economics. Economics, fundamentally a social science, heavily relies on mathematical concepts to analyze data, model behavior, and derive insights. Understanding the mathematical foundations is crucial for topics ranging from microeconomics to macroeconomics, financial economics, econometrics, and beyond. This article will explore the significance of math in economics, provide examples of common mathematical problems encountered in economic studies, and offer a comprehensive answer key to typical practice problems.

Importance of Mathematics in Economics

Mathematics serves as the backbone of economic theory and practice. Here are several reasons why math is critical in the field of economics:

1. Quantitative Analysis

- Economists utilize mathematical models to quantify relationships between variables. For instance, they might model how changes in supply and demand affect prices.
- Mathematical techniques help in analyzing large datasets, which is crucial for empirical research in economics.

2. Formulating Economic Theories

- Many economic concepts, such as utility maximization, profit maximization, and cost minimization, are expressed mathematically.
- Mathematical proofs are often used to establish the validity of economic theories.

3. Policy Formulation and Evaluation

- Governments and organizations rely on mathematical models to predict the outcomes of economic policies.
- Sensitivity analysis, which examines how the output of a model changes with variations in input parameters, is essential for effective policymaking.

Common Mathematical Concepts in Economics

Several mathematical concepts are frequently encountered in economics. Understanding these is crucial for solving economic problems effectively:

1. Algebra

- Linear Equations: Used to represent relationships between economic variables.
- Quadratic Equations: Commonly appear in profit and cost functions.

2. Calculus

- Differentiation: Used to find marginal costs and marginal revenue.
- Integration: Useful for calculating consumer and producer surplus.

3. Statistics and Probability

- Descriptive Statistics: Summarizes data sets to provide insight into central tendencies and variations.
- Inferential Statistics: Helps economists make predictions and test hypotheses based on sample data.

4. Linear Programming

- A method for finding the best outcome in a mathematical model with constraints, often applied in resource allocation problems.

5. Game Theory

- A mathematical framework for analyzing competitive situations where the outcome depends on the actions of multiple agents.

Mathematics Practice Problems in Economics

To facilitate understanding, here are some typical math practice problems encountered in economics, followed by their solutions.

Problem Set

Problem 1: Supply and Demand Equations
Given the demand equation $Q_d = 100 - 2P$ and the supply equation $Q_s = 20 + 3P$, find the equilibrium price and quantity.

Problem 2: Marginal Cost and Revenue
A firm has a total cost function given by $TC = 50 + 4Q + Q^2$. Calculate the marginal cost (MC) when $Q = 10$.

Problem 3: Consumer Surplus
If the demand function is $P = 100 - 4Q$ and the market price is set at $P = 40$, calculate the consumer surplus.

Problem 4: Elasticity of Demand
Given the demand function $Q = 60 - 2P$, calculate the price elasticity of demand when $P = 15$.

Problem 5: Linear Programming
A company produces two products, A and B. Each unit of A requires 3 hours of labor and each unit of B requires 2 hours. The company has a maximum of 120 hours available. The profit from product A is $10 and from product B is $5. Formulate the linear programming problem to maximize profit.

Answer Key

Here are the solutions to the problems presented above:

Solution 1: Supply and Demand Equations

To find the equilibrium, set $Q_d = Q_s$:

$$
100 - 2P = 20 + 3P
$$
$$
100 - 20 = 3P + 2P
$$
$$
80 = 5P
$$

$$
P = 16
$$

Substituting P back into either equation to find Q:

$$
Q_d = 100 - 2(16) = 68
$$

Equilibrium price is $16, and equilibrium quantity is 68 units.

Solution 2: Marginal Cost and Revenue

Calculate the marginal cost as the derivative of total cost TC with respect to Q:

$$
MC = \frac{d(TC)}{dQ} = \frac{d(50 + 4Q + Q^2)}{dQ} = 4 + 2Q
$$

When $Q = 10$:

$$
MC = 4 + 2(10) = 24
$$

Marginal cost when $Q = 10$ is $24.

Solution 3: Consumer Surplus

First, find the quantity demanded at $P = 40$:

$$
40 = 100 - 4Q \implies 4Q = 60 \implies Q = 15
$$

The consumer surplus is the area of the triangle formed by the demand curve and the price level:

$$
CS = \frac{1}{2} \times (\text{Base} \times \text{Height}) = \frac{1}{2} \times 15 \times (100 - 40) = \frac{1}{2} \times 15 \times 60 = 450
$$

Consumer surplus is $450.

Solution 4: Elasticity of Demand

The price elasticity of demand (PED) is calculated using the formula:

$$
PED = \frac{dQ}{dP} \times \frac{P}{Q}
$$

From the demand function $Q = 60 - 2P$:

$$
\frac{dQ}{dP} = -2
$$

When $P = 15$:

$$
Q = 60 - 2(15) = 30
$$

Thus,

$$
PED = -2 \times \frac{15}{30} = -1
$$

Price elasticity of demand at $P = 15$ is -1.

Solution 5: Linear Programming

Let x be the number of product A produced, and y be the number of product B produced. The objective function to maximize profit is:

$$
Maximize \quad Z = 10x + 5y
$$

Subject to the constraints:

$$
3x + 2y \leq 120
$$
$$
x \geq 0, \quad y \geq 0
$$

This is a standard linear programming problem that can be solved using graphical methods or simplex methods.

Conclusion

Math practice for economics is not merely an academic exercise; it is a vital skill that equips

students and professionals with the tools necessary to analyze economic phenomena critically. By mastering the mathematical concepts discussed and practicing with various problems, learners can develop a deeper understanding of economic theories and their applications. The answer key provided serves as a guide to assess comprehension and reinforce learning, ultimately fostering a more robust grasp of economics in practice.

Frequently Asked Questions

What topics are typically covered in math practice for economics?

Topics often include algebra, calculus, statistics, and optimization techniques that are essential for analyzing economic models.

How can I find a reliable answer key for math practice problems in economics?

You can find answer keys in textbooks, online educational resources, or academic websites that specialize in economics and mathematics.

Are there online resources available for practicing math related to economics?

Yes, websites like Khan Academy, Coursera, and various university resources offer practice problems and solutions for math in economics.

Why is math practice important for studying economics?

Math practice helps students understand complex economic theories, make data-driven decisions, and solve quantitative problems effectively.

What types of math problems are common in economics courses?

Common problems include calculating elasticity, optimizing functions, analyzing cost and revenue, and interpreting statistical data.

How can I improve my math skills for economics?

Regular practice, seeking help from tutors, using online resources, and applying math concepts to real-world economic scenarios can greatly enhance your skills.

Is it necessary to have a strong math background to study economics?

While not strictly necessary, a strong math background can significantly enhance your understanding of economic principles and improve your analytical skills.

What should I do if I struggle with math problems in economics?

Consider joining study groups, attending tutoring sessions, or using online tutorials to reinforce your understanding of the material.

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Le mathématicien autrichien Hans Hahn étudie à l'université de Vienne où il est très ami avec 3 autres futurs grands scientifiques, Paul Ehrenfest, Heinrich Tietze et Herglotz. ... Afficher sa ...

Testy matematyczne
Testy dla uczniów i nie tylko. Sprawdź swoją wiedzę matematyczną.

Exercices corrigés - Calcul exact d'intégrales
Déterminer toutes les primitives des fonctions suivantes, sur un intervalle bien choisi : $$\begin {array} {lll} \displaystyle f_1 (x)=5x^3-3x+7&\displaystyle f_2 (x ...

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On pourra d'abord montrer que la forme différentielle est fermée, et utiliser le théorème de Poincaré. Pour la recherche des primitives, on résoudra successivement les équations aux ...

Exercices corrigés - Intégrales multiples
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Exercices corrigés - Exercices - Analyse
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