

ADARSH GYANODAYA VIDYALAYA

SENIOR SECONDARY SUMMER HOLIDAY HOMEWORK — JUNE 2026

CLASS XII (TWELVE) — SCIENCE & COMMERCE STREAMS

Dear Students,

Class XII is a vital milestone in your academic journey, requiring consistent effort, deep conceptual clarity, and disciplined preparation for the CBSE Board Examinations. These summer assignments have been curated to reinforce foundational topics, sharpen your problem-solving skills, and encourage independent analytical thinking. Complete all written exercises in dedicated subject notebooks with precision and structural clarity.

1. Subject Matrix & Scope of Work

Review this matrix to identify tasks relevant to your chosen stream (Science, Commerce, or Humanities/Arts Electives).

Subject	Syllabus Units Covered	Notebook Work
English Core	Advanced Reading, Formal Invitations, Literature (Board Prep)	Yes
Physics	Electric Charges & Fields, Electrostatic Potential & Capacitance	Yes
Chemistry	Solutions, Electrochemistry (Part I)	Yes
Biology	Sexual Reproduction in Flowering Plants, Human Reproduction	Yes
Mathematics	Relations & Functions, Inverse Trigonometric Functions, Matrices	Yes
Accountancy	Accounting for Partnership Firms (Fundamentals & Goodwill)	Yes
Business Studies	Nature & Significance of Management, Principles of Management	Yes
Economics	National Income Accounting, Money and Banking	Yes
Painting	Rajasthani School of Miniature Painting, Pahari School	Yes

2. Core Academic Board-Prep Assignments

A. English Core (Compulsory for All Streams)

Q1. Advanced Reading & Comprehension Analysis: Read a comprehensive, data-driven essay on the impact of Artificial Intelligence on global employment paradigms from a reputable journal or newspaper.

- (a) Draft systematic notes using the note-making format, featuring clear indentation, abbreviation keys (minimum 5), and standard sub-headings.
- (b) Draft a concise summary of the essay in not more than 80 words.

Q2. Formal Writing (Invitations & Replies):

- (a) Draft a formal printed invitation card on behalf of the Principal and Staff of Adarsh Gyanodaya Vidyalaya, inviting parents and eminent citizens to the Annual Sports Meet.
- (b) Write a formal letter accepting an invitation to preside as the Chief Guest at an Inter-School Debate Competition, explaining your arrival details.

Q3. Literature Critical Analysis (Flamingo & Vistas): Answer the following in 120–150 words:

- (a) Analyze how the transition of power and language is portrayed in Alphonse Daudet's *The Last Lesson*. Focus on the theme of linguistic chauvinism.
- (b) Contrast the structural settings of Seemapuri and Firozabad in Anees Jung's *Lost Spring*. How do these environments perpetuate the vicious circle of poverty?

B. Physics (Science Stream)

Q1. Electrostatic Fields & Coulomb's Law:

- (a) Two identical metallic spheres A and B , each carrying a charge q , repel each other with a force F when placed at a distance r . A third uncharged identical sphere C is first touched with A , then with B , and finally removed. What is the new force of repulsion between A and B ?
- (b) Derive an expression for the electric field intensity at any point on the equatorial line of an electric dipole. Plot a graph showing the variation of electric field E with distance r for $r \gg a$.

Q2. Gauss's Law Applications: State Gauss's Law in electrostatics. Using this law, derive an expression for the electric field intensity due to an infinitely long, straight, uniformly charged wire of linear charge density λ .

Q3. Capacitance & Dielectrics:

- (a) Derive the expression for the capacitance of a parallel plate capacitor when a dielectric slab of thickness t ($t < d$) is introduced between its plates.
- (b) A network of four $10 \mu\text{F}$ capacitors is connected to a 500 V supply. Calculate the equivalent capacitance of the network and the charge on each capacitor.

C. Chemistry (Science Stream)

Q1. Concentration Terms & Henry's Law:

- (a) Calculate the molarity and molality of a 20% (w/w) aqueous solution of potassium iodide (KI). (Density of the solution is 1.202 g mL^{-1}).

- (b) State Henry's Law. Explain its key applications in deep-sea diving and the production of carbonated beverages.

Q2. Raoult's Law & Colligative Properties:

- (a) Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 L of water at $25^\circ C$, assuming it is completely dissociated.
- (b) Explain the molecular origin of non-ideal solutions showing: (i) positive deviations, and (ii) negative deviations from Raoult's Law. Illustrate with vapor pressure-composition diagrams.

Q3. Molar Mass Determination: A solution containing 12.5 g of a non-electrolyte substance in 170 g of water gave a boiling point elevation of 0.63 K. Calculate the molar mass of the substance. (K_b for water is $0.52 \text{ K kg mol}^{-1}$).

D. Biology (Science Stream)

Q1. Sexual Reproduction in Flowering Plants:

- Explain the structural development of a male gametophyte (pollen grain) in angiosperms. Draw a neat, labeled diagram of a mature pollen grain showing the vegetative and generative cells.
- What is double fertilization? Describe the post-fertilization changes that lead to the transformation of an ovule into a seed and an ovary into a fruit.

Q2. Human Reproduction & Oogenesis:

- Provide a detailed schematic representation of spermatogenesis and oogenesis in humans. Highlight the major ploidy levels at each stage.
- Describe the hormonal regulation of the menstrual cycle in human females. Mention the roles of LH, FSH, Estrogen, and Progesterone.

Q3. Board Practical Diagram File: In your laboratory practical journal, draw neat, detailed diagrams showing the TS of an anther, TS of an ovary, a mature Anatroous Ovule, and the developmental stages of a human blastocyst.

E. Mathematics (Science & Commerce Elective)

Q1. Relations & Functions:

- Let $A = \mathbb{R} \setminus \{3\}$ and $B = \mathbb{R} \setminus \{1\}$. Consider the function $f : A \rightarrow B$ defined by:

$$f(x) = \frac{x-2}{x-3}$$

Show that f is a bijective function (both one-one and onto).

- Let R be a relation on the set of all real numbers defined by aRb if and only if $1 + ab > 0$. Check whether the relation R is reflexive, symmetric, or transitive.

Q2. Inverse Trigonometric Functions: Prove the following algebraic identity:

$$\tan^{-1} \left(\frac{\cos x}{1 - \sin x} \right) = \frac{\pi}{4} + \frac{x}{2}, \quad x \in \left(-\frac{\pi}{2}, \frac{3\pi}{2} \right)$$

Q3. Matrices & Systems of Equations: Solve the following system of linear equations using the matrix inversion method:

$$2x - 3y + 5z = 11$$

$$3x + 2y - 4z = -5$$

$$x + y - 2z = -3$$

F. Accountancy (Commerce Stream)

Q1. Theoretical Foundations: Explain the accounting treatment of the following items in the absence of a written Partnership Deed:

- Sharing of Profits and Losses.
- Interest on Partners' Capital.
- Interest on Partners' Drawings.
- Interest on Loan advanced by a partner to the firm.

Q2. Profit & Loss Appropriation & Capital Accounts: Ram and Shyam are partners sharing profits in the ratio of 3 : 2. Their capitals on 1st April 2025 were \$100,000 and \$80,000 respectively. Interest on capital is agreed @ 6% p.a. Shyam is allowed an annual salary of \$6,000. During the year, Ram withdrew \$10,000 and Shyam withdrew \$12,000. Interest on drawings was charged @ \$500 on Ram's drawings and \$600 on Shyam's drawings. The net profit of the firm before making these adjustments was \$40,000.

- (a) Prepare the Profit and Loss Appropriation Account for the year ended 31st March 2026.
- (b) Prepare the Partners' Capital Accounts under both Fluctuating and Fixed Capital methods.

Q3. Goodwill Valuation Methods: Define goodwill. Calculate the value of goodwill of a firm on the basis of three years' purchase of the super profits, given that the average capital employed is \$200,000, the normal rate of return is 10%, and the average profits of the last five years are \$32,000.

G. Business Studies (Commerce Stream)

Q1. Nature & Significance of Management: "Management is considered a multi-faceted discipline that is both an Art and a Science." Critically evaluate this statement. Detail how management acts as a profession in the modern corporate landscape.

Q2. Taylor's Scientific Management vs. Fayol's Principles:

- (a) Draft a comprehensive tabular comparison between Henri Fayol's Principles of General Management and F.W. Taylor's Scientific Management on the basis of: (i) Perspective, (ii) Focus, (iii) Expression, and (iv) Applicability.
- (b) Explain the scientific techniques of "Functional Foremanship" and "Method Study" with real-world industry examples.

Q3. Case Study Analysis: An automobile manufacturing giant is experiencing a decline in sales due to lack of coordination between its Production Department and Marketing Department.

- (a) Identify the management values missing in this scenario.
- (b) Suggest five concrete administrative steps to establish effective coordination.

H. Economics (Commerce Stream)

Q1. National Income Accounting:

- (a) Differentiate between "Real GDP" and "Nominal GDP". Why is Real GDP considered a better indicator of economic welfare than Nominal GDP? Mention three limitations of using GDP as an index of welfare.
- (b) Given the following macroeconomic data, calculate National Income (NNP_{FC}) using: (i)

the Income Method, and (ii) the Expenditure Method.

Particulars
Private Final Consumption Expenditure
Government Final Consumption Expenditure
Net Domestic Capital Formation
Net Exports
Compensation of Employees
Operating Surplus (Rent, Interest, Profit)
Mixed Income of Self-Employed
Net Factor Income from Abroad (NFIA)
Net Indirect Taxes

Q2. Money and Banking: Explain the credit creation process of commercial banks using a hypothetical numerical illustration. How does the Central Bank (RBI) use qualitative and quantitative credit control instruments (Repo Rate, CRR, Open Market Operations) to control inflation?

I. Painting (Arts / Elective)

Q1. Rajasthani School of Miniature Painting: Write an essay (150–200 words) on the origin, development, and sub-schools (Mewar, Bundi, Jodhpur, Bikaner, Kishangarh) of the Rajasthani School of Miniature Painting.

Q2. Artistic Appreciation: Critically analyze the famous miniature painting "Radha (Bani-Thani)" or "Maru-Ragini" based on: (i) Medium and Technique, (ii) Color Palette, (iii) Composition, and (iv) Aesthetic Merit.

Q3. Fine Arts Practical Portfolio: On professional cartridge sheets, sketch and render:

- (a) Two composition paintings depicting traditional Indian festivals, using watercolors or poster colors.
- (b) A highly detailed still-life layout containing a book, a flower vase, and drapery, using advanced pencil shading techniques (2B to 8B).

3. Interdisciplinary & Research-Based Board Projects

Choose and complete one project from this section based on your academic stream.

A. Science Stream: Mathematical Modeling of Semiconductor & Field Physics

Construct a comprehensive research portfolio or a functional experimental prototype exploring electrostatics or semiconductor physics. Prepare a detailed project report covering:

- Electrostatic Potential Modeling:** Calculate the potential and field intensity equations at different distances around your prototype using Gauss's Law.
- Chemical Solute Physics:** Analyze the chemistry of the copper etching solutions or the chemical composition of dielectric materials (such as ceramic or mica sheets) used in capacitor systems.
- Mathematical Integration:** Use calculus tools to express how electrostatic potential or charge accumulation changes over time during capacitor charging cycles ($q(t) = Q_0(1 - e^{-t/RC})$).

B. Commerce Stream: Financial Valuation & Macroeconomic Environment Analysis

Create a simulated business plan for a joint-stock company or a partnership firm in an emerging industry (e.g., green hydrogen, sustainable logistics, or organic consumer goods). Your portfolio must include:

- Partnership Deed & Financial Structure:** Draft a comprehensive Partnership Deed or Memorandum of Association. Construct starting ledger accounts showing capital contributions and asset allocation.
- Capital Accounts Modeling:** Prepare a comparative analysis showing how profits are shared and how capital accounts fluctuate over three simulated fiscal quarters.
- National Income Contribution Analysis:** Trace how your business's output contributes to the overall GDP, national income metrics, and sector-wise value-added accounting in the national economy.

4. Board-Prep Homework Tracker

Check off each subject box as you complete your notebooks, research files, and projects!

Homework Status Check-Sheet

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|--|--|
| <input type="checkbox"/> English Core Advanced Notebook Work | <input type="checkbox"/> Accountancy Fundamentals Portfolio |
| <input type="checkbox"/> Physics Fields & Capacitance Derivations | <input type="checkbox"/> Business Studies Management Analysis |
| <input type="checkbox"/> Chemistry Solutions & Volumetric Analysis | <input type="checkbox"/> Economics Macroeconomics Exercises |
| <input type="checkbox"/> Biology Microscopic Diagrams | <input type="checkbox"/> Mathematics Relations & Matrices Work |
| <input type="checkbox"/> Painting Composition Portfolio | <input type="checkbox"/> Selected Stream Interdisciplinary Project |
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★ **Wishing you a highly analytical, productive, and safe summer break!** ★