D.A.V CENTENARY PUBLIC SCHOOL, CHANDER NAGAR, GZB

HOLIDAY'S HOMEWORK

SESSION:2026-27

CLASS: XII

D.A.V. CENTENARY PUBLIC SCHOOL, CHANDER NAGAR, GHAZIABAD
HOLIDAY HOME WORK 2026-27
CLASS XII

SUBJECT	DETAILS
ACCOUNTANCY	CHAPTER 1 – FUNDAMENTALS OF PARTNERSHIP Q.4 TO Q.73 CHAPTER 2 – GOODWILL AND CHANGE IN PSR Q.1. TO Q.46 CHAPTER 3 – ADMISSION OF A PARTNER Q.1 – Q.46
BUSINESS STUDIES	1 Complete your project files according to the allocated topic/product. 2 Revise chapter marketing management and consumer protection throughly.
MARKETING	Prepare a PPT on Product Life cycle Collect different types of Labels from actual products used in your house like soaps etc. and classify them (Paste them in notebook with their types)
ECONOMICS	1 Complete your project files according to the allocated topic. 2 Revise NIA throughly.
ENGLISH	1. Topic: Impact of Technology /AI on Human Life Write 500–1000 words including: * Introduction * Benefits * Challenges * Real examples * Conclusion with your viewpoint 2.Internship-Style Task Learn ANY ONE real-life skill: * Teaching a child * Helping in family business * Volunteering * Learning digital skill (Canva, Excel, coding, video editing) Write a learning diary (7 days): * What you did daily * Skills gained * Challenges faced * Self-reflection *Add 20 Advanced vocabulary and phrases in each writing. 3. Communication Skill Task Record a 3–5 min speech/video on: * My future goals * My biggest learning from school life * India in 2040 * Power of education Submit script + reflection. Represent yourself as News anchor consisting 20 Advanced vocabulary and phrases. 4. Gratitude & Self-Growth Journal Write journal entries: * Things you are grateful for * Lessons from failures * Personal strengths & weaknesses * Letter to your future self

	Focus well on your tenses usage and advanced vocabulary ,idioms and phrases.
IP	Part A: Basic Queries 1. Create a table **EMPLOYEE** with fields: EmpID, Name, Department, Salary. • Insert 5 records into it. • Write a query to display all employees. • Write a query to show employees from the "HR" department. 2. Write a query to: • Display names of students who scored more than 75 marks. • Count the total number of students in the table. • Show the highest and lowest marks. Part B: Intermediate Queries 3. Using the **EMPLOYEE** table: • Increase salary of employees in "Sales" by 10%. • Delete the record of an employee with EmpID = 103. • Display employees sorted by salary (descending order). 4. Create a table **BOOKS** with fields: BookID, Title, Author, Price. • Write a query to find books priced between 200 and 500. • Display books written by "R.K. Narayan". • Show the average price of all books. Part C: Advanced Queries 5. Write queries for the **STUDENT** table: • Display the number of students in each class using GROUP BY. • Show students who have the same marks using HAVING. • Find the second highest marks using ORDER BY. 6. Create a table **ORDERS** with fields: OrderID, CustomerName, Product, Quantity, Price. • Write a query to calculate the total bill for each order (Quantity * Price). • Display customers who ordered more than 3 products. • Find the most expensive product ordered. Creative Task • Design a **poster or chart** showing SQL command categories: • **DDL** (CREATE, ALTER, DROP) • **DML** (INSERT, UPDATE, DELETE)
CS	Beginner Programs • Write a program to check if a number is prime. • Create a program to reverse a string. • Write a program to calculate factorial using recursion. Intermediate Programs • Build a simple calculator using functions.

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• Write a program to find the largest element in a list/array.
• Handle exceptions in a program that divides two numbers.
Advanced Challenge
• Create a program that simulates a bank account system (deposit, withdraw, balance check).
• Write a program to generate a random password with letters, numbers, and symbols.
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<tr><td>PHYSICS</td><td>
1) Prepare an investigatory project with a working model(if possible) from the topics given as below:
(i) To study the response of LDR(photoresistor) to the variation of intensity of light.
(ii)To study the variation of Faraday's law of electro magnetic Induction.
(iii)To study the Wheatstone bridge circuit working with its application.
(iv)To study the mutual induction of two adjacent inductive coils.
(v)To study the charging and discharging of capacitors in RC circuit.
(vi)To study the working of Half/Full wave rectifier.
(vii) To investigate the dependence of the angle of deviation on the angle of incidence using hollow prism one by one filled with transparent liquids.
(viii) To study the effect of resistivity of electrolyte.
(ix) To investigate the relation between the ratio of
1)Input and Output Voltage 2) No. of Turns in the secondary coil and Primary coil of a self made transformer.
2) Practice paves the way to success. Hence utilize your vacations and practice the syllabus covered so far in Physics. Do all the ncert back exercise questions and intext questions of the chapter Electrostatic. Also the assignment given to you.
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<tr><td>CHEMISTRY</td><td>
CHEMISTRY 1. Do all intext and back exercise questions of NCERT text book for the following Chapters
(1) Solutions
(2) Haloalkanes and Haloarenes
(3) Alcohols, Phenols and Ethers

2. Prepare a sheet displaying all name reactions from Organic chemistry class 11th and 12th
3. Prepare a Chemistry Project Report as per CBSE norms
4. Prepare Concept map for Colligative properties from Solutions chapter .
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<tr><td>BIOLOGY</td><td>
INVESTIGATORY PROJECT (Hand written)

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<tr><th>S.NO.</th><th>TOPIC</th></tr>
<tr><td>1.</td><td>Mendalian Disorders</td></tr>
<tr><td>2.</td><td>Chromosomal Disorders</td></tr>
<tr><td>3.</td><td>Haemophilia</td></tr>
<tr><td>4.</td><td>Sickle cell Anaemia</td></tr>
<tr><td>5.</td><td>Viruses/ Human genome project</td></tr>
<tr><td>6.</td><td>Drug and alcohol abuse</td></tr>
<tr><td>7.</td><td>Thalessemia</td></tr>
<tr><td>8.</td><td>Cancer</td></tr>
<tr><td>9.</td><td>Sewage treatment/ Human evolution</td></tr>
<tr><td>10.</td><td>Biocontrol agents</td></tr>
<tr><td>11.</td><td>Reproductive health(STD'S/ART)</td></tr>
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	12. Stem cells and their future 13. Agents of pollination 14. Congenital disorders and their possible cures 15. Biopiracy **Instructions:** ● Your project should have cover page, certificate, acknowledgement, index, introduction/abstract, main content and references.Project should be handwritten. (minimum 15-20 pages) ● Draw/paste colored pictures/photographs. ● **Mandatory to Add the research work along with the project. Try to add photographs of your research work for reference.** **Complete your Biology registers till Reproductive health chapter.**
POLITICAL SCIENCE	Prepare a hand written project on any topic from your NCERT text book Detailed Project Guidelines: 1. Cover Page Title of the Project Student's Name Class and Section Roll Number Subject School Name Session 2026–27 2. Certificate 3. Acknowledgement 4. Index 5. Introduction Brief background of the topic (1–2 pages). 6. Main Content 7. Maps.illustrations, Bibliography 8.Detailed explanation with headings and subheadings. 9.Please complete all the NCERT questions and exercises given in your text book Also learn all the chapters.
PHYSICAL EDUCATION	Make a project on Any one game of your choice out of the list below. Labeled diagram of field & equipment (Rules, Terminologies & Skills) Basketball, Football, Kabaddi, Kho-Kho, Volleyball, Handball, Hockey, Cricket, Boxing and Judo. Solve Unit Test Question Paper in your note book. Assignment 1 Long Answers Questions 5 Markers 1. Elucidate the committees and their responsibility of inter-school CBSE Basketball Tournament. 2. What is the meaning of Tournament? Draw a Knock-out fixture for 29 teams. 3. What do you mean by specific sports programmes? Explain any three. 4. What is a league tournament? Draw a fixture of s7 teams using round robin method. 5. Discuss in detail about sports day. 6. Explain the procedure for giving bye. 7. Explain different steps to be followed for organizing a health run in our school. 8. While organizing sports events for the Annual Sports Day, Kartikey and Bewan being the

	captained vice-captain of sports, formed various committees. 9. What should be the role of technical and marketing committee while organizing the event? 10. Explain pre during and post game responsibilities of various committees for organizing a sports tournament smoothly.
PAINTING	**Long answer type questions** **Q.1** Explain the origin and development of the Rajasthani School of Miniature Painting. **Q.2** What are the main themes depicted in Rajasthani miniature paintings? **Q.3** Describe the costume, architecture, and nature depiction in Rajasthani paintings. **Q.4** Write an appreciation of Maru-Ragini painted by Sahibdin of the Mewar School. **Q.5** Describe the composition and colour scheme of Chaugan Players painted by Dana. **Q.6** Explain the beauty and grace shown in Radha (Bani-Thani) painted by Nihal Chand. **Q.7** Write a note on Krishna on Swing painted by Nuruddin. **Q.8** Describe the emotional expression in Bharat Meets Rama at Chitrakuta painted by Guman. **Q.9** Describe the characteristics of the Rajasthani School of Painting. **<u>Practical work</u>** - Make any two folk art paintings on A2 size sheet. - Make a bird composition & a colour wheel on A
PSYCHOLOGY	Part 1: Self Assessment Write about your: ● Interests ● Aptitude ● Personality traits ● Career goals Also explain how these attributes influence your life decisions. (250–300 words) Part 2: Interview Task Interview two people of different age groups. Ask them about their: ● Stress management ● Decision-making style ● Relationships and communication ● Motivations in life ● Fears or challenges ● Emotional reactions in difficult situations Compare their psychological attributes and write your observations in 1000 words.
MUSIC	**Prepare a project file on the following topics:** 1) परिभाषाएं अलंकार , कण, मींड, खटका, मुर्की, गमक, ग्राम, मूर्च्छना आलाप, तान 2)रागों का समय सिद्धान्त 3) ग्रंथ परिचय क)संगीत रत्नाकर ख) संगीत परिजात
HINDI	1.निम्नलिखित साहित्यकारों के आधार पर एक सुंदर एवं रचनात्मक परियोजना कार्य तैयार कीजिए- i) हरिवंशराय बच्चन ii) सूर्यकांत त्रिपाठी 'निराला'

	iii) तुलसीदास iv) महादेवी वर्मा v) फणीश्वर नाथ रेणु प्रत्येक साहित्यकार के लिए निम्न बिंदुओं पर जानकारी संकलित कर परियोजना कार्य पूर्ण कीजिए • जीवन परिचय (जन्म शिक्षा एवं साहित्यिक योगदान) • प्रमुख रचनाएँ (कविता,कहानी, उपन्यास आदि) • साहित्यिक विशेषताएं (भाषा शैली, भाव पक्ष, विचारधारा, समाज एवं मानवता के प्रति दृष्टिकोण) • पाठ्यपुस्तक (आरोह भाग-2) में शामिल रचना का सार • प्रेरणादायक विचार/ प्रसिद्ध पंक्तियाँ (प्रत्येक साहित्यकार की दो-तीन प्रसिद्ध पंक्तियाँ) • वर्तमान समय में प्रासंगिकता (आज की पीढ़ी इनके साहित्य से क्या सीख सकती है?) 2. निम्नलिखित विषय पर लगभग 200 शब्दों में रचनात्मक लेख लिखिए – i) डिजिटल युग में हिंदी भाषा ii) ग्रामीण जीवन बनाम शहरी जीवन

D.A.V. CENTENARY PUBLIC SCHOOL, CHANDER NAGAR, GHAZIABAD
Holiday Homework, Class: XII – 2026-27 (Mathematics)

Chapter- 1 (Relations and Functions)

1. Let R be a relation on the set of N given by R = {(a, b): a = b – 2, b > 6}. then
   (a) (2,4) ∈ R (b) (3 ,8) ∈ R (c) (6 ,8) ∈ R (d) (8 ,7) ∈ R .
2. Let R be a reflexive relation on a set A and I be the identity relation on A. Then (a) R = I
   (b) R ⊂ I (c) I ⊂R (d) R ≠ I
3. Let A = {1 ,2 ,3}. Then the number of relations containing (1 ,2) and (1 ,3), which are reflexive and symmetric but not transitive is: (a) 1 (b) 2 (c) 3 (d) 4
4. The maximum number of equivalence relations on the set A = { 1 ,2 ,3) is : (a) 1
   (b) 2 (c) 3 (d) 5
5. Let A = {1 ,2 ,3}. Then the number of equivalence relations containing (1 ,2) is: (a) 1
   (b) 2 (c) 3 (d) 4
6. Let R be a relation on the set of N given by n R m if n divides m. Then R is (a)reflexive & symmetric (b)transitive & symmetric (c) equivalence
   (d) reflexive ,transitive but not symmetric .
7. For any two real number a and b , we define a R b iff $\sin^2 a + \cos^2 b = 1$. The relation R on set R of all real numbers is: (a) reflexive but not symmetric (b) symmetric but not transitive (c) transitive but not reflexive (d) an equivalence relation .
8. If A is the set of even natural numbers less than 8 and B is the set of prime numbers less 7, then the number of the relations from A to B is: (a) 2^9
   (b) 9^2 (c) 3^2 (d) 2^{9-1}
9. The number of reflexive relations on a set A consisting of n elements is equal to: (a) 2^{n^2} (b) n^2 (c) $2^{n(n-1)}$ (d) $n^2 - n$
10. Let R be a reflexive relation on a finite set A having n elements and let there be m ordered pair in R, then:
    (a) m≥ n (b) $m \leq n$ (c) m = n (d) none of these
11. Let A = {1 ,2 ,3 ,4}. Let R be the equivalence relation on A× A define by (a, b) R (c, d) iff a +d = b + c. Find the equivalence class [{1 ,3}]
12. Is the relation R on the set R of real numbers defined by R = {(a, b): a, b ∈ R , $1 + ab \geq 0$ } transitive.? Justify your answer.
13. If R = {(x, y): x + 2y = 8} is a relation on N, write the range of R?
14. Is the relation R on the set Q of rational numbers defined by R = {(a, b): a, b ∈ Q , $a < b^2$} symmetric? Justify your answer.
15. State the reason for the relation R in the set {1 ,2 ,3} given by {(1 ,2), (2 ,1)} not to be transitive.
16. Determine whether the relation R in the set A {1 ,2, 3……!0} defined by: R = {(x, y): 2x – y = 0} is reflexive, symmetric and transitive.

17. Let R = {(a,a^3): a is a prime number less than 5} .be a relation. Find the range of R.
18. Let R be the relation on W, set of whole numbers defined by R = {(x, y): x, y ∈ W , $3x + 2y = 12$ } is reflexive , symmetric and transitive .
19. A relation R in the set of real number R defined as R = {(a, b): $\sqrt{a} = b$ } is a function or not. Justify?
20. Show that f : $N \to N$ given by f(x) = $\begin{cases} \frac{n+1}{2}, & n\ is\ odd \\ \frac{n}{2}, & n\ is\ even \end{cases}$ is many -one onto function .
21. Prove that a function f : [0, ∞) → [$-5, \infty$) defined as f(x) = $4x^2 + 4x - 5$ is both one-one and onto .
22. Show that the relation R on the set r of real numbers, defined as $R = \{(a, b); a \leq b^2\}, is\ neither$ reflexive nor symmetric nor transitive.
23. Let R be the set of real numbers and R be the relation on R defined by R = $\{(a, b) : |a| \leq |b|\}$. Show that R is neither nor symmetric nor transitive.
24. Let R be the relation on Z defined by $R = \{(a, b) : a\ b\ \in Z, |a - b| \leq 5\}$. Check whether R is reflexive, symmetric and transitive.
25. Let Z be the set of all integers and R be a relation on Z defined by $R = \{(a, b) : a\ b\ \in Z, (a - b)\ is\ divisible\ by\ 5\}$, Prove that R is an equivalence relation. Find the set of all elements of Z related to 1.
26. Show that the relation R defined by (a, b) R (c, d) ⇨a + d = b +c on $A \times A$, where A = {1 ,2 ,3 ,4……10} is an equivalence relation. Hence write the equivalence class [(3 ,4)].
27. Let A = R – {2} and B = R – {1}. Show that the function f: A → $B\ defined\ by\ f(x) = \frac{x-1}{x-2}$ is bijective.

Case-Study:

Read the following passage and answer the following questions:

1. A school organizing a debate competition with participants as speakers S = { s_1,s_2, s_3, s_4} and these are judges J ={ $j_1 j_2, j_3$} . Each speaker can be assigned one judge. Let R be a relation from set S to set J defined as R = {(x, y): speaker x is judged by judge y, x∈ $S, y \in J$ } .

On the basis of the above information, answer the following questions:

(i) How many relations can be there from S to J ?

(ii) A student identifies a function from S to J as f = {(s_1, j_1), (s_2, j_2), (s_3, j_2)(s_4, j_3)}. Check if it is bijective?

(iii) How many one-one functions can be there from set S to set J?

Or

Another student considers a relation $R_1 = \{(S_1, S_2), (S_2, S_2)\}$ in set S. Write minimum ordered pair to be included in R_1 so that R_1 is reflexive but not

Chapter-3 (Inverse Trigonometric Functions)

1. Evaluate: $\tan^{-1}\left[2\sin\left(2\cos^{-1}\frac{\sqrt{3}}{2}\right)\right]$
2. Find the domain of $f(x) = \sin^{-1}\left(-x^2\right)$
3. If $\cot^{-1}(3x+5) > \frac{\pi}{4}$, then find the range of of the value of x?
4. Find the number of real solutions of the equation: $\sqrt{1+\cos 2x} = \sqrt{2}\cos^{-1} x\ in\left[\frac{\pi}{2}, \pi\right]$

5. Find the value of: $\sin\left(2\sin^{-1}(0.6)\right)$.
6. If $4\sin^{-1}x+\cos^{-1}x=\pi$, then find the value of x.
7. Express: $\tan^{-1}\left[\frac{\cos x}{1-\sin x}\right]$, $\frac{\pi}{-2}<x<\frac{\pi}{2}$ in simplest form.
8. Find the principal value of: $\tan^{-1}(1)+\cot^{-1}\left(-\frac{1}{2}\right)+\sin^{-1}\left(-\frac{1}{\sqrt{2}}\right)$.
9. $\cos^{-1}\left(\frac{\sin x+\cos x}{\sqrt{2}}\right)$, $\frac{\pi}{4}\le x\le\frac{5\pi}{4}$, is equal to x - $\frac{\pi}{4}$, in its simplest form.
10. Find the value of: $\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right)+\cot^{-1}\left(\frac{1}{\sqrt{3}}\right)+\tan^{-1}\left(\sin\left(-\frac{\pi}{2}\right)\right)$.
11. Evaluate: $\sec^2\left(\tan^{-1}\frac{1}{2}\right)+\cos ec^2\left(\cot^{-1}\frac{1}{3}\right)$.

Chaper-3 (Continuity & Differentiability)

1. Show that the function f(x) = 2x - $|x|$ is continuous at x = 0
2. Discuss the continuity of the function $f(x)=\begin{cases}\frac{1-\cos x}{x^2}, if x\neq 0\\ 5\quad, if x=0\end{cases}$ $at\ x=0$
3. Discuss the continuity of the function $f(x)=\begin{cases}|x|\cos\frac{1}{x}, if\ x\neq 0\\ 0\quad\quad if\ x=0\end{cases}$ $at\ x=0$
4. Discuss the continuity of the function $f(x)=\begin{cases}\frac{e^x-1}{\log(1+2x)}, & if\ x\neq 0\\ 7\quad\quad , & if\ x=0\end{cases}$ $at\ x=0$
5. Find the left hand and right hand derivatives of: f(x) = $\begin{cases}x-3, & x<2\\ 2x-5, & x\ge 2\end{cases}$ at x = 2.
6. Is the function f(x) = $|x|$ derivable at x = 0?
7. Is the function f(x) = $\cot x$ derivable at x = $\frac{\pi}{2}$?
8. Show that the function f(x) = x$|x|$ is continuous at x = 0. Is it differentiable at x = 0?
9. Show that the function f(x) = $|x-3|$, x ∈ R is continuous but not differentiable at x = 3?
10. Show that the function f(x) =$|x+1|+|x-1|$, x ∈ R is not differentiable at x = 1 and x = 1?
11. Discuss the continuity of the function at x = 0 : f(x) = $\begin{cases}\frac{x^4+2x^3+x^2}{\tan^{-1}x}, x\neq 0\\ 0\quad\quad , x=0\end{cases}$
12. $y=\sin^{-1}\left(\frac{3\sin^{-1}x+4\cos^{-1}x}{5}\right)$
13. $y=\sin^{-1}\left(\frac{\sqrt{1+x}+\sqrt{1-x}}{2}\right)$
14. $y=\sin^{-1}\left(\frac{5x+12\sqrt{1-x^2}}{13}\right)$
15. $y=\sec^{-1}\left(\frac{\sqrt{x}+1}{\sqrt{x}-1}\right)+\sin^{-1}\left(\frac{\sqrt{x}-1}{\sqrt{x}+1}\right)$
16. $y=\sin^2\left(\tan^{-1}\sqrt{\frac{1-x}{1+x}}\right)$

17. $y = \sin^{-1}\left(x\sqrt{1-x} - \sqrt{x}\sqrt{1-x^2}\right), 0 < x < 1$

18. $y = \cot^{-1}\left(\dfrac{\sqrt{1+\sin^{-1}x} + \sqrt{1-\sin^{-1}x}}{\sqrt{1+\sin^{-1}x} - \sqrt{1-\sin^{-1}x}}\right)$

19. $\sin(xy) + \dfrac{x}{y} = x^2 - y$

20. Find $\frac{dy}{dx}$ at x = 1, y = $\frac{\pi}{4}$, if $\sin^2 y + \cos xy = k$

21. If $\cos^{-1}\left(\frac{x^2-y^2}{x^2+y^2}\right) = \tan^{-1} a$, prove that $\frac{dy}{dx} = \frac{y}{x}$

22. If y = x cos $(a + y)$, prove that $\frac{dy}{dx} = \frac{sin^2(a+y)}{\sin(a+y) - y\cos(a+y)}$

23. If $\cos y = x\cos(a+y)$, prove that $\dfrac{dy}{dx} = \dfrac{\cos^2(a+y)}{\sin a}$

24. Find $\frac{dy}{dx}$, if y = $x^{\log x} + (\log x)^x$

25. Find $\frac{dy}{dx}$, if y = $x^{\cos x} + (\sin x)^{\tan x}$

26. Find $\frac{dy}{dx}$, if y = $(\sin 2x)^x + \sin^{-1}\sqrt{3x}$

27. Find $\frac{dy}{dx}$, if y = $e^{x^2\cos x} + (\cos x)^x$

28. Find $\frac{dy}{dx}$, if y = $(\log x)^x + x^{x\cos x}$

29. Find $\frac{dy}{dx}$, if y = $x^x(\cos x)^x + \sin^{-1}\sqrt{x}$

30. Find $\frac{dy}{dx}$, if $(\cos x)^y = (\cos y)^x$

31. Find $\frac{dy}{dx}$ (i) $x = acos^3t$, $y = bsin^3t$ (ii) $x = acos^3t$, $y = bsin^3t$ (iii)
$x = a\left(\frac{1-t^2}{1+t^2}\right)$, $y = \frac{2bt}{1+t^2}$ (iv) $x = asec^3\theta$, $y = a\,tan^3\theta$ at $\theta = \frac{\pi}{3}$
(v) $x = a(2\theta - \sin 2\theta)$, $y = a(1 - \cos 2\theta)$ at $\theta = \frac{\pi}{3}$

32. Find $\frac{dy}{dx}$ if x = $e^t(\sin t + \cos t)$, y = $e^t(\sin t - \cos t)$

33. Differentiate $tan^2(2x+1) w.r.t. log|2x+1|$.

34. Differentiate $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ $w.r.t.$ $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$.

35. Differentiate $\tan^{-1}\left(\frac{2x}{1-x^2}\right)$ $w.r.t.$ $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$

36. If $y = \left(\tan^{-1}x\right)^2$, then show that: $\left(x^2+1\right)^2 y_2 + 2x\left(x^2+1\right)y_1 = 2$

37. If $y = \log\left[x + \sqrt{x^2+a^2}\right]$, show that: $\left(x^2+a^2\right)\dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} = 0$

38. If $y = \left[x + \sqrt{x^2+1}\right]^n$, then show that: $\left(x^2+1\right)\dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} = n^2y$

39. If $y = \log\left[\sqrt{x} + \dfrac{1}{\sqrt{x}}\right]^2$, then show that: $x\left(x+1\right)^2\dfrac{d^2y}{dx^2} + (x+1)^2\dfrac{dy}{dx} = 2$

40. If $x^m y^n = (x+y)^{m+n}$, prove that $\dfrac{d^2y}{dx^2} = 0$