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Sample Question Paper - SET 1

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Class	XII	Subject	Mathematics (041)
Chapter	6 - Application of Derivatives	Time Allowed	18 Minutes
Maximum Marks	6	Date	_____

GENERAL INSTRUCTIONS:

1. This question paper contains **3 questions** from Chapter 6 - Application of Derivatives.
2. All questions are compulsory.
3. Question 1 carries **2 marks**.
4. Question 2 carries **3 marks**.
5. Question 3 carries **4 marks**.
6. Show all steps of your calculations clearly.
7. Use proper mathematical notation and terminology.

HOW TO SUBMIT:

1. Solve this question paper in your notebook or on loose sheets.
2. Clearly write your **Name, CBSE Roll Number, School Name, Place, and Date** on the first page.
3. Upload your solved paper at our website: **www.mathlove.in**

4. Check your **detailed report card on the website** after evaluation.
5. For any queries or assistance, WhatsApp us at **+91-7869553517**

SECTION A - 2 MARKS QUESTION

Q1. Sand is pouring from a pipe at the rate of 12 cm^3/s. The falling sand forms a cone on the ground in such a way that the height of the cone is always one-sixth of the radius of the base. How fast is the height of the sand cone increasing when the height is 4 cm? **[2]**

SECTION B - 3 MARKS QUESTION

Q2. Prove that the function $f(x) = \log(1 + x) - 2x/(2 + x)$ is strictly increasing on $(0, \infty)$. **[3]**

SECTION C - 4 MARKS QUESTION

Q3. Prove that the volume of the largest cone that can be inscribed in a sphere of radius R is 8/27 of the volume of the sphere. Also find the height of the cone in terms of R.

OR

A rectangular sheet of paper of fixed perimeter with sides having their lengths in the ratio 8:15 is converted into an open rectangular box by folding after removing squares of equal area from all four corners. If the total area of the removed squares is 100 cm^2, find the dimensions of the original sheet and the maximum volume of the box formed. **[4]**

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