Differentiation Using GeoGebra

Spoken Tutorial Project
http://spoken-tutorial.org
National Mission on Education through ICT
http://sakshat.ac.in

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Learning Objectives

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We will learn how to use GeoGebra to,

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- **Understand Differentiation**

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- **Draw graphs of derivatives of functions**

System Requirement

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- **Ubuntu Linux OS v 16.04**

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- **GeoGebra 5.0.481.0-d**

Pre-requisites

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- **GeoGebra interface**

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- **GeoGebra interface**
- **Differentiation**
- **For relevant tutorials, please visit our website**
  www.spoken-tutorial.org

Differentiation: First Principles

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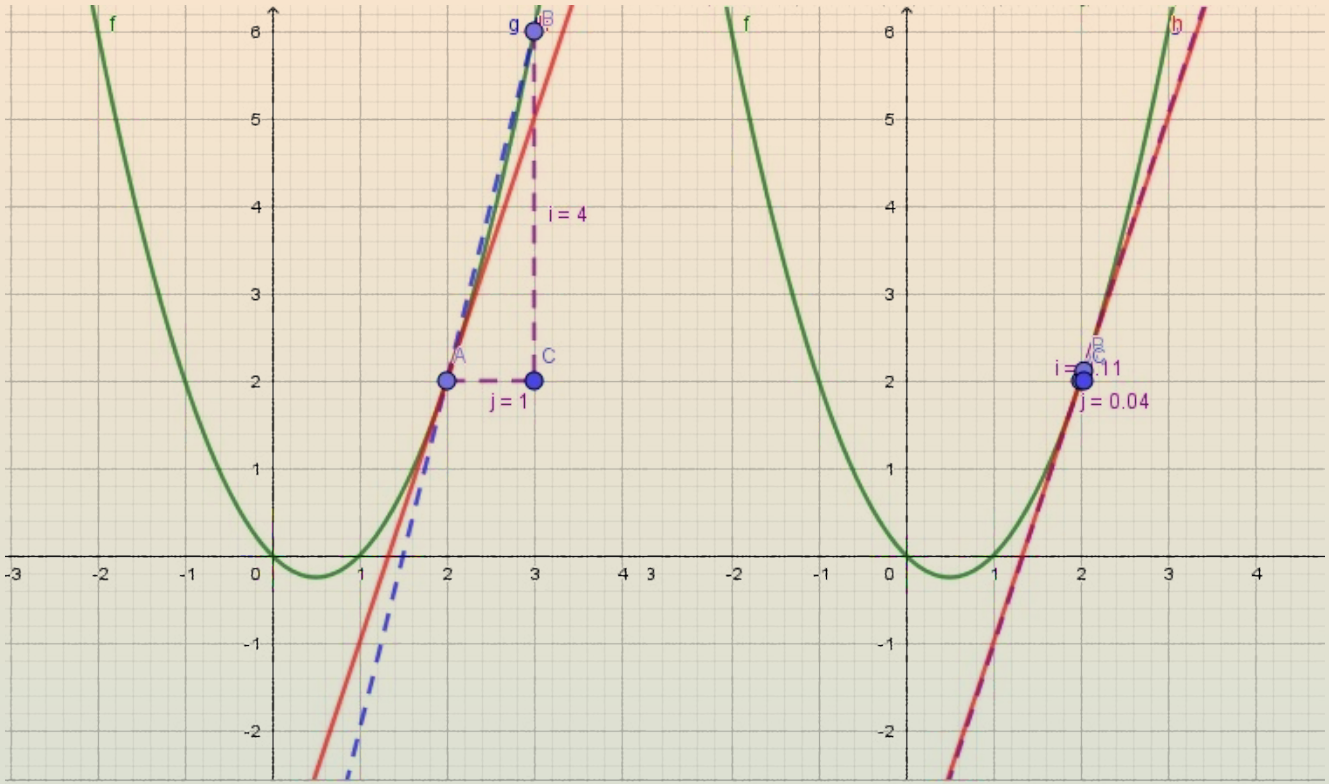

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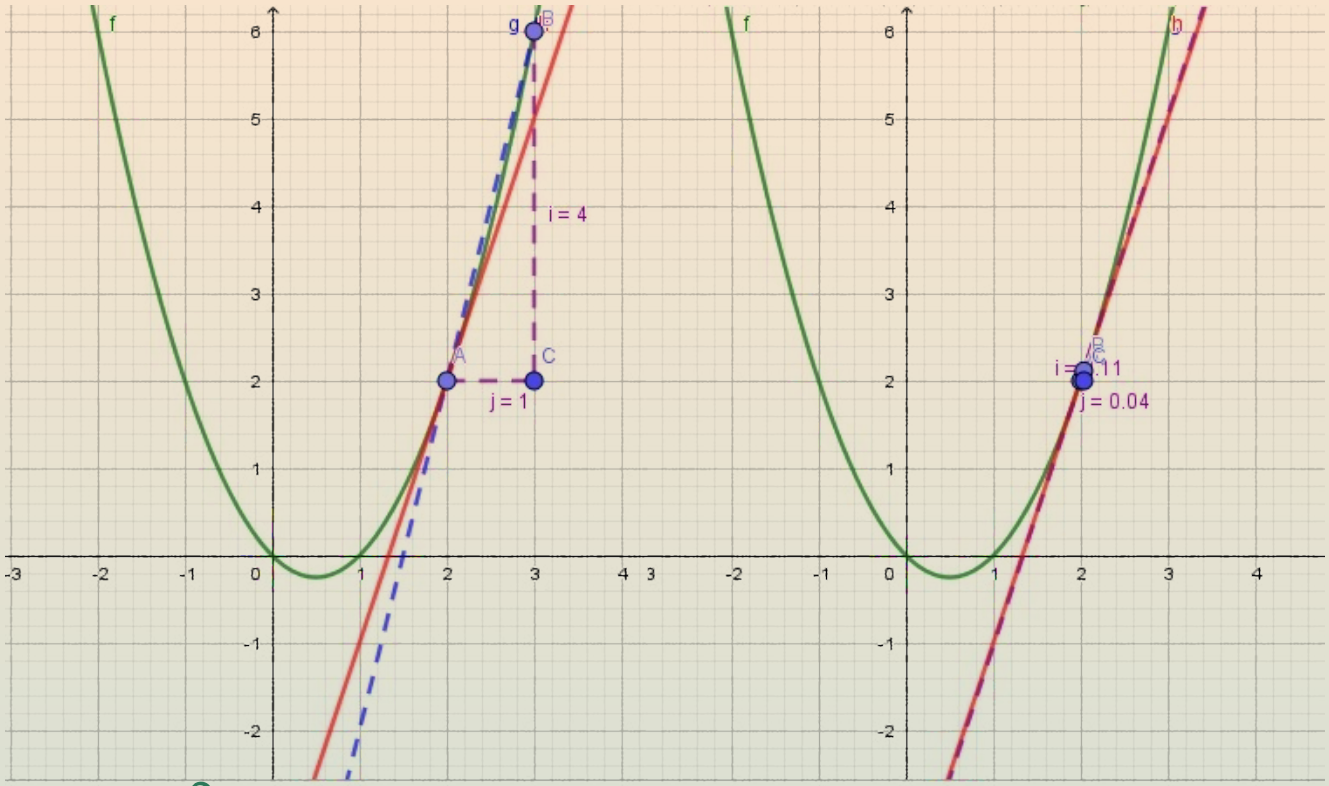

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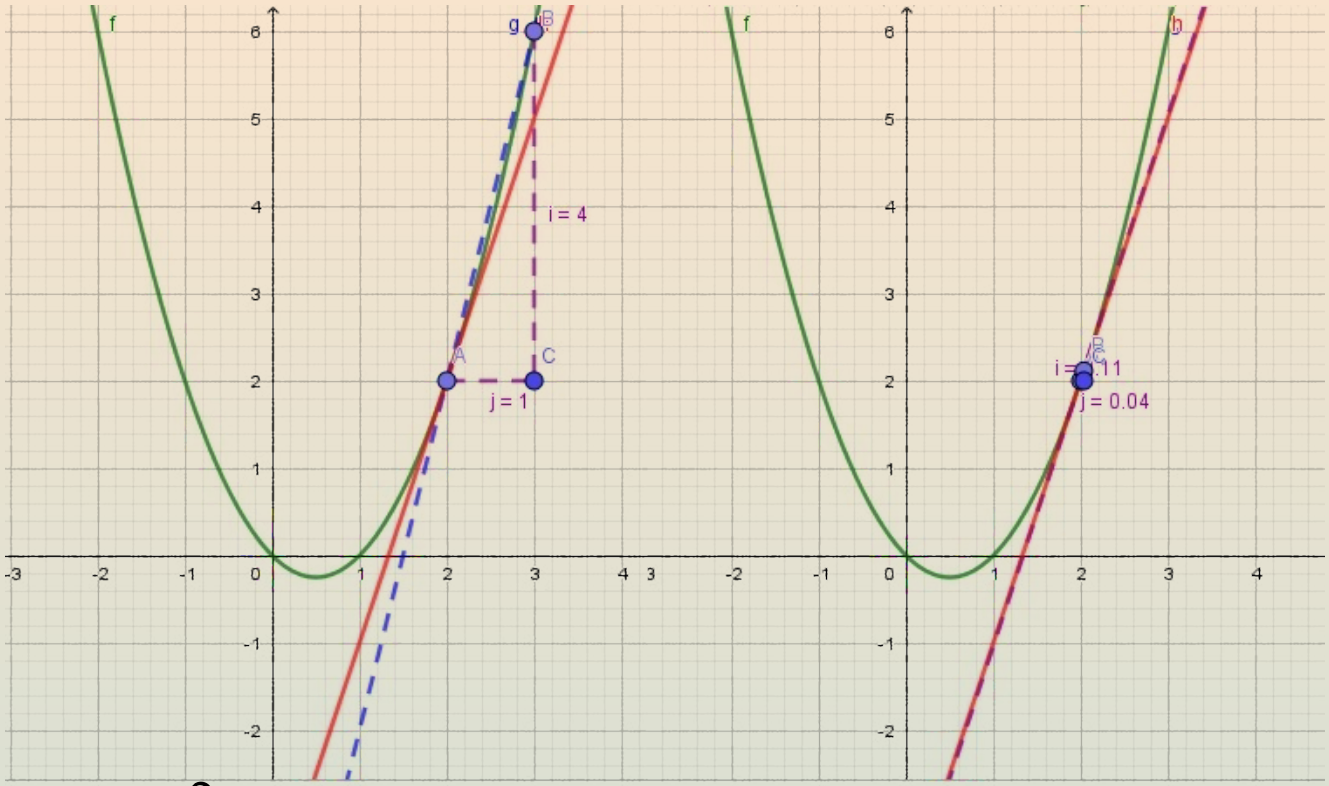

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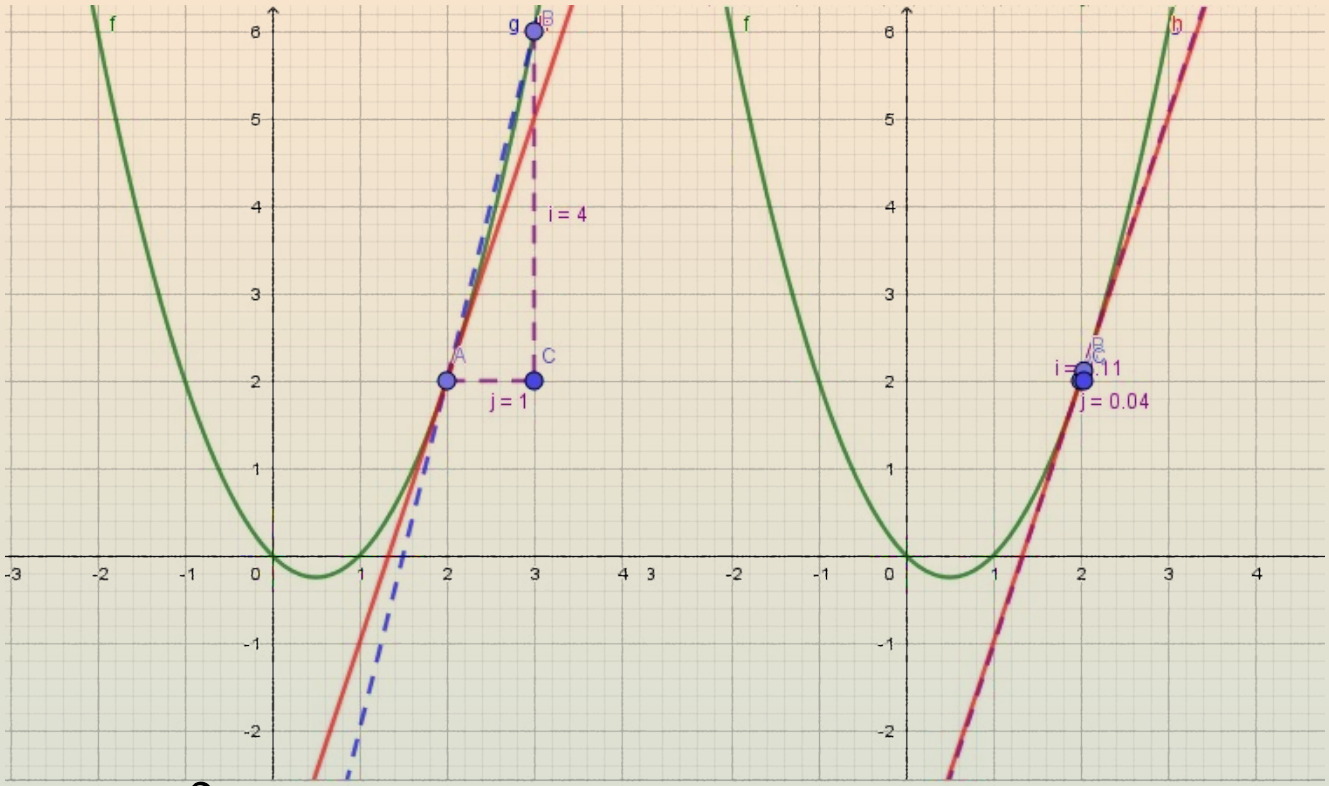

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- $A(x, f(x)), B(x + j, f(x + j))$

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- $f'(x) = \lim_{j \to 0} \frac{(x+j)^2 - (x+j) - (x^2 - x)}{(x+j-x)}$

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- **For** $g(x) = 5 + 12x - x^3, g'(x) = -3x^2 + 12$

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A Practical Application of Differentiation

- **We have a 24 inches by 15 inches piece of cardboard**
- **We have to convert it into a box**
- **Squares have to be cut from the four corners**
- **What size squares should we cut out to get the maximum volume of the box?**

A Sketch of the Cardboard

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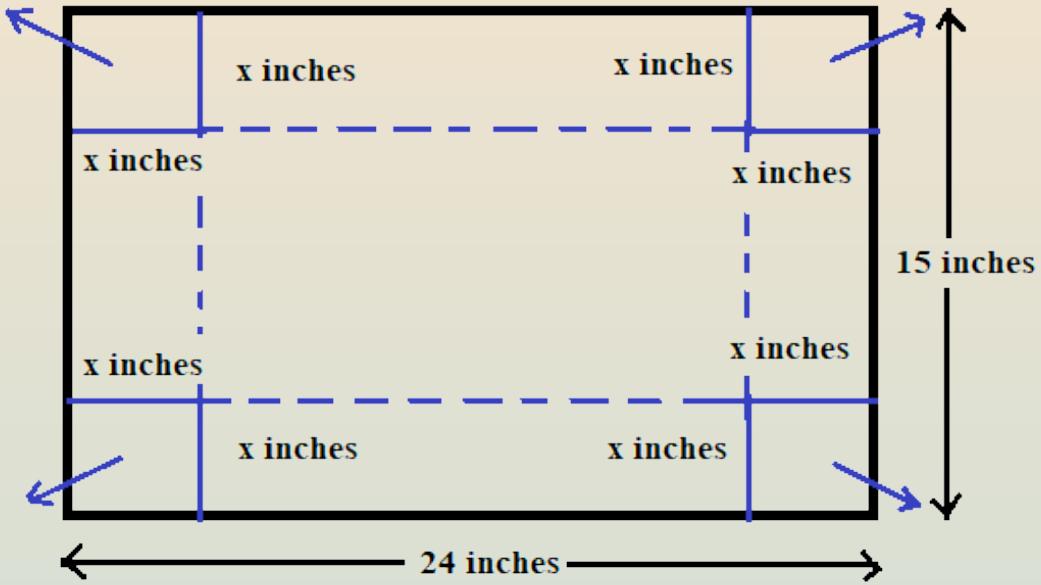
- **Let us draw the cardboard**



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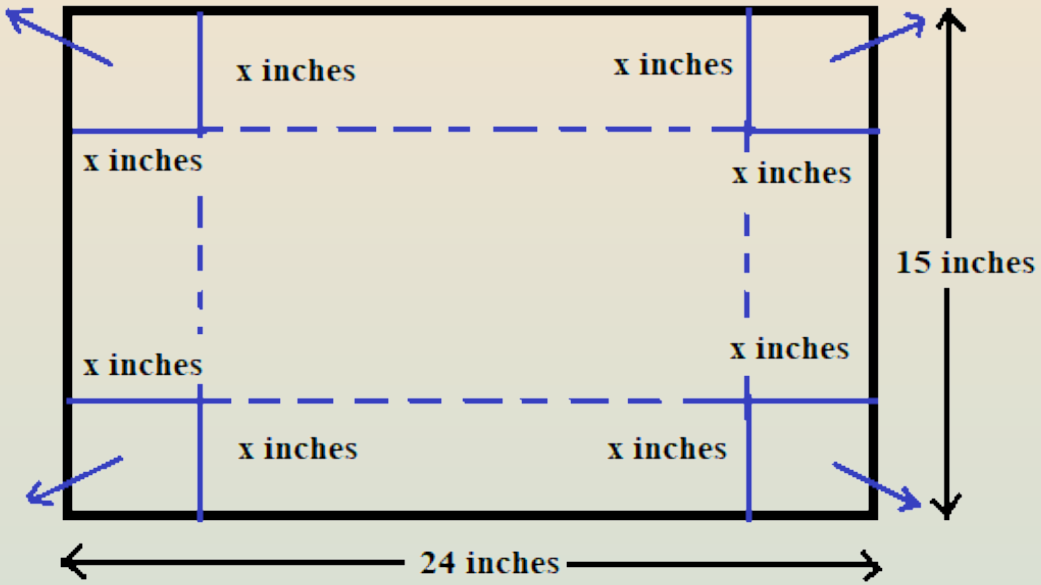

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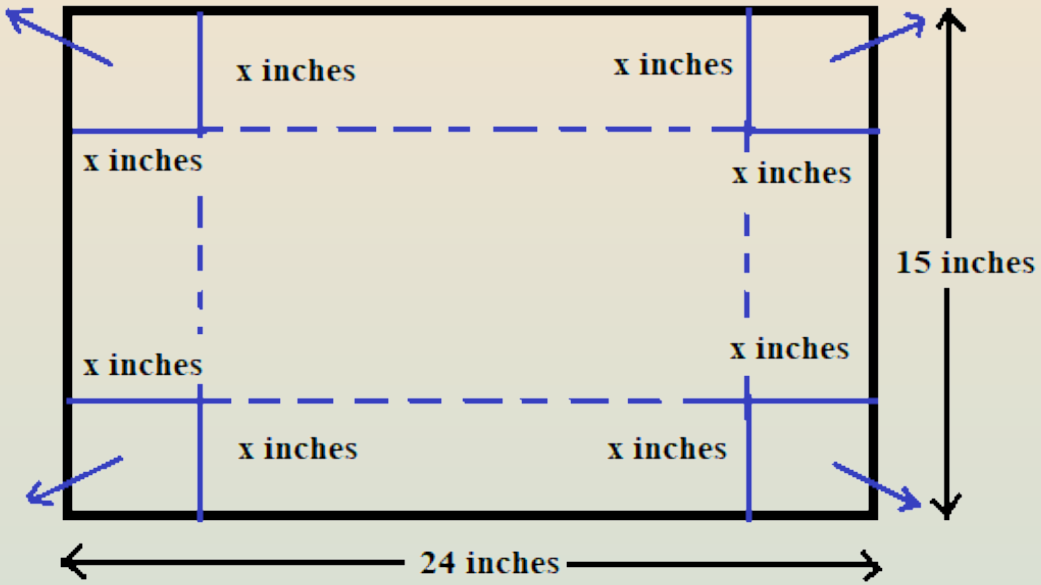

- **The volume function here is** $(24 - 2x) * (15 - 2x) * x$ **cubic inches**

Summary

We have learnt how to use GeoGebra to,

- **Understand differentiation**
- **Draw graphs of derivatives of functions**

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- $j(x) = (5x^3 + 3x - 1)/(x - 1)$
- **Find the derivatives independently and compare with GeoGebra graphs**

About the Spoken Tutorial Project

- **Watch the video available at http://spoken-tutorial.org /What_is_a_Spoken_Tutorial**
- **It summarizes the Spoken Tutorial project**
- **If you do not have good bandwidth, you can download and watch it**

Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- **Conducts workshops using spoken tutorials**
- **Gives certificates to those who pass an online test**
- **For more details, please write to contact@spoken-tutorial.org**

Forum for specific questions

- **Do you have questions in THIS Spoken Tutorial?**
- **Please visit http://forums.spoken-tutorial.org**
- **Choose the minute and second where you have the question**
- **Explain your question briefly**
- **Someone from our team will answer**

Acknowledgements

- Spoken Tutorial Project is a part of the Talk to a Teacher project
- It is supported by the National Mission on Education through ICT, MHRD, Government of India
- More information on this Mission is available at

  http://spoken-tutorial.org /NMEICT-Intro