Week 7
Term 1
2024

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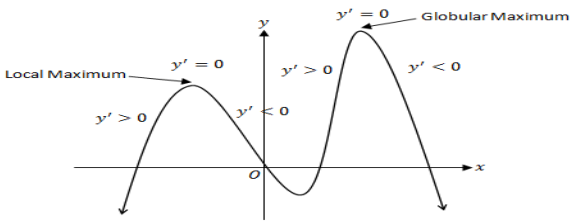
MM3
Further differentiation and applications

Goals

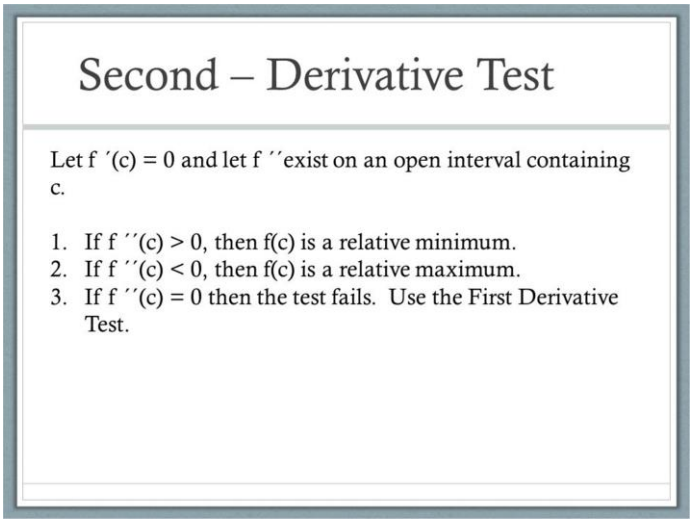
The second derivative and applications of differentiation:

- use the increments formula: $\delta y \cong \frac{dy}{dx} \times \delta x$ to estimate the change in the dependent variable y resulting from changes in the independent variable x
- understand the concept of the second derivative as the rate of change of the first derivative function
- recognise acceleration as the second derivative of position with respect to time
- understand the concepts of concavity and points of inflection and their relationship with the second derivative
- understand and use the second derivative test for finding local maxima and minima
- sketch the graph of a function using first and second derivatives to locate stationary points and points of inflection
- solve optimisation problems from a wide variety of fields using first and second derivatives.



Theoretical Components

Resources:
Maths Quest Year 12 Chapter 7 and Maths Quest Specialist Chapter 5 (pdf on Google Drive)



Practical Components

STEP 2

Ex 5B Second derivatives

- Qs 1 (1st and 3rd column), 3 (c, d, e, k), 5, 6, 9, 11

Ex 5C Analysing the behaviour of functions using the second derivative

- Qs 1 and 2 (a, d, g, j), 3 – 5, 10 – 13

Investigation

STEP 3

See below!

QFO
Quiz/Forum/Other

Don't forget to do the Cambridge Task!

Remember to check-in with Serene each lesson and get your named marked off.

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Investigation Week 7

1. Develop a three-step Chain Rule for the derivative $\frac{dy}{dx}$, where y is a function of $u, and\ u\ is\ a\ function\ of\ v, and\ v\ is\ a\ function\ of\ x.$

2. Hence differentiate $y = \frac{1}{1+\sqrt{1-x^2}}$ using your three-step chain rule from part (a).