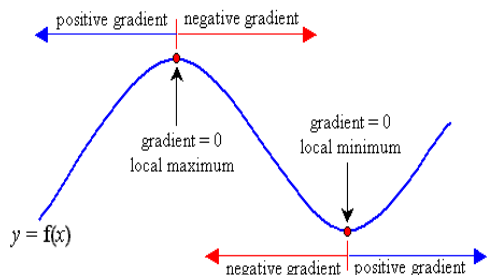


Goals

This brief we are:

- Finding the stationary points of polynomial functions [$f'(x)=0$]
- Sketching graphs of polynomial functions using gradient function
- Classifying the type of stationary points: local maximum or minimum turning point, point of inflection
- Using differentiation to find maximum and minimum values and to solve problems in a practical context
- Sketching functions using the derivative



Theoretical Components

Resources:

Maths Quest Year 11 Chapter 9

Knowledge Checklist:

- what is a rate?
- constant rates
- variable rates
- average rates of change
- instantaneous rates of change
- interpret graphs that illustrate rates of change
- equations of tangents
- what is a limit?
- evaluating limits
- what is a gradient function?
- **what is the x-intercept of a gradient function?**
- **power rule**
- **finding gradient functions by sketching**
- **finding gradient functions by using the rule**
- **finding gradient functions using your CAS**
- **sketching polynomials**

Videos:

<https://www.youtube.com/watch?v=H-XDX7T0ADw>

<https://www.youtube.com/watch?v=HMhmC9rLzew>

<https://www.youtube.com/watch?v=cdVq028miuk>

<https://www.youtube.com/watch?v=YWvpnY2R9PY>

Practical components

Do the following questions from **Chapter 9 – Differentiation** (pdf – GC). Organise your solutions neatly in your exercise book.

Ex 9F Sketching graphs containing stationary points

- Qs 1 and 2 (a,c,e,h), 3, 6, 7, 9, 10, 11(a,c,e)

Ex 9G Solving maximum and minimum problems

- Qs 1, 3, 6, 7, 8, 10, 11, 13, 14

Investigation

See the following page.

Make sure you prepare your Journal Entry for Weeks 9-10, Week 11, Week 12, and Week 13-14 if you haven't already.

QFO

Quiz/Forum/Other

Mathspace task: Derivative Applications 2 –

<https://mathspace.co/student/tasks/CurriculumCustomTask-766088/>

MM2 Week 13-14 Investigation



The height above of sea level of the lower arch of the Sydney Harbour Bridge can be modelled using the equation:

$$y = -0.00188(x - 251.5)^2 + 118$$

Assuming Sydney Tower is 1km from the far side of the bridge, **show** that the top of Sydney Tower will first be visible from the arch at $x = 207.81\text{m}$.

The top point of Sydney Tower is 327m above sea level.

Use the calculus techniques you have learnt to complete this task.

- *Remember not to round until the end of your calculations.*
- *Draw the diagram first!*