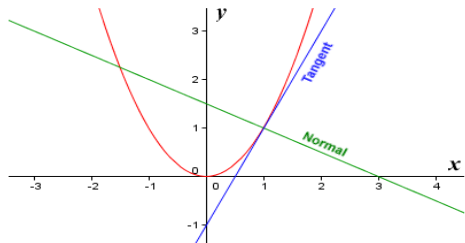# HAWKER COLLEGE
Engage | Inspire | Achieve

Goals

This week we are:

- Finding the gradient function (derivative) of polynomial functions using rules
- Learn and use the chain, product and quotient rule for differentiation

Theoretical Components

Make notes on the following chapters and website:

Maths Quest 11 Mathematical Methods
- 9D - Finding derivatives by rule

Maths Quest 12 Mathematical Methods
- 7D - The chain rule
- 7H - The product rule
- 7I - The quotient rule
- 7E - The derivative of e^x
- 7F - The derivative of $\log_e x$
- 7G - The derivative of $\sin x, \cos x \ and \ \tan x$

Knowledge Checklist:
- finding gradient functions by using the rule
- finding derivatives by power, chain, product and quotient rule

Practical Components

Do the following questions:
Organise your solutions neatly in your exercise book.

You will require Chapter 9 of Maths Quest 11 Mathematical Methods (pdf – Google Classroom)
- 9D: all

You will require Chapter 7 of Maths Quest 12 Mathematical Methods (pdf – Google Classroom)
- 7D: 1, 2, 4, 5, 6, 7b, 7d, 7f, 7h, 8, 10c, 10d, 13
- 7H: 1, 3, 4c, 4d, 4r, 8
- 7I: 1-2, 4a, 4d, 4l, 5-7
- 7E: 1,g h f. 2 j,k,l 3,4, 5 m n 6,7,8,9
- 7F : 7 to 13
- 7G : 10 to 13

Investigation

See the following page

Other

Fun fact: Derivatives are used to define the concept of how smooth a function is over a domain. We define the differentiability class of a function as the highest order of derivative that exists and is continuous. Functions that have derivatives of all orders are known as C-infinity functions.

Week 11 Investigation

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 1 km from the far side of the bridge, **prove** that Sydney Tower will first be visible from the arch at $x = 207.81\ m$.

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

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