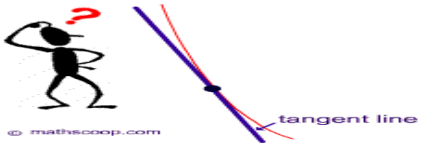
Week 7/8
Term 3
2021

HAWKER COLLEGE
Engage | Inspire | Achieve

MM2: Introduction to Differential Calculus

Goals



This fortnight we endeavour to:

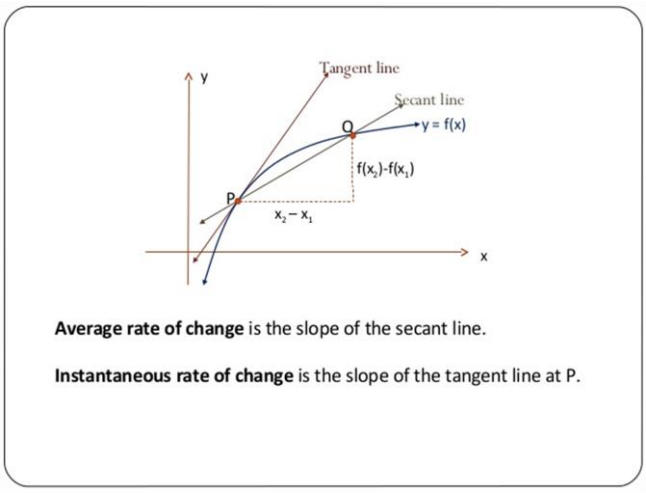
- understand the concept of rate of change and to identify increasing, decreasing or constant sections of functions
- understand average rates of change and use and apply gradients of tangents
- understand instantaneous rates of change and to compare average and instantaneous rates of change
- find equations of tangent lines and relate the gradient function to the original function
- informally find the rule for the gradient function

Theoretical Components

Resources:
Maths Quest Year 11 Chapter 8
Rates of Change Notes and Exercises (handout)

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



Practical Components

Do the following questions from **Chapter 8 – Rates of Change** (pdf – GC). Organise your solutions neatly in your exercise book.

Ex 8A Identifying Rates
- Q's 1, 2, 4, 7

Ex 8B Constant Rates
- Q's 1 – 3, 6, 8, 12

Ex 8C Variable Rates
- Q's 1, 2, 4, 5

Ex 8D Average Rate of Change
- Q's 1 – 3, 7 – 9

Ex 8E Instantaneous Rate of Change
- Q's 1, 2, 5, 6

Investigation

See the following page.

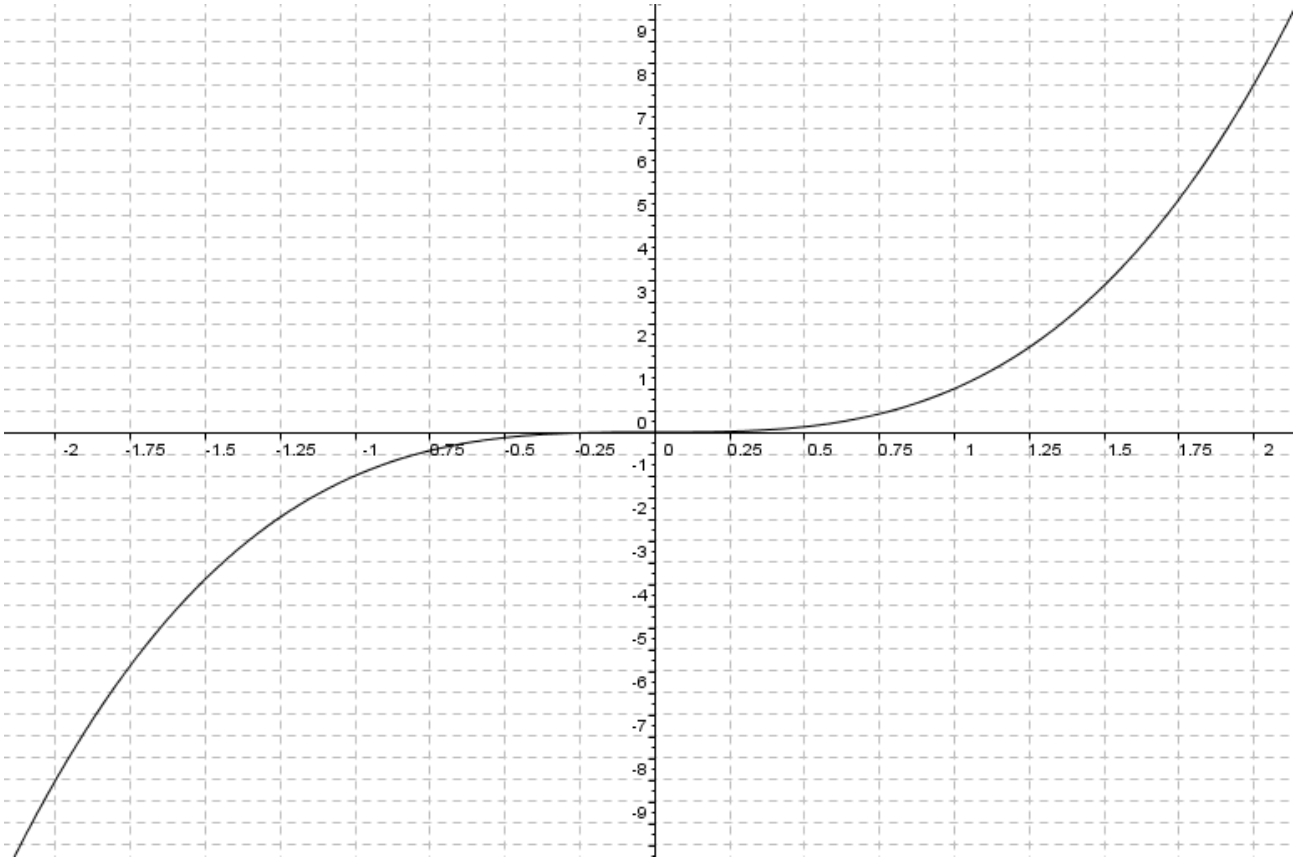
QFO

Quiz/Forum/Other

Remember to join the google meet each Monday, complete the check-ins and formative assessment task, and submit your investigation.

MM2 INVESTIGATION Weeks 7/8

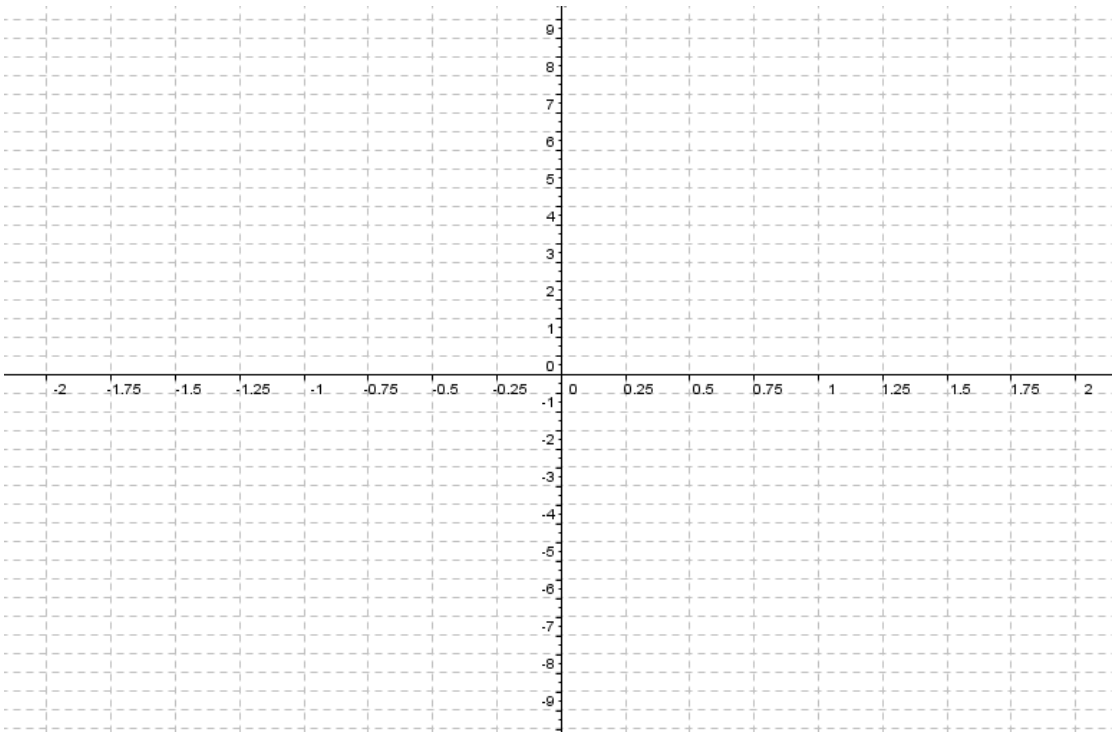
Here is a graph of the cubic function $y = x^3$



1. You are to draw (as best as possible using a ruler), tangents at the positions as indicated in this table, and calculate the gradient of those tangents (remember: gradient of a straight line is rise/run) and fill in the relevant row.

X (coordinate)	-2	-1	-0.5	0	0.5	1	2
Y (coordinate)	-8	-1	-1/8	0			
Gradient of the tangent (rise/run) 3dp accuracy				0			

2. Draw a graph of *x* vs *the gradient value*. On the x-axis use the same x-values, on the y - axis instead of drawing the graph $y = x^3$, you are going to draw a graph of the gradient. Plot the points (*x*, *gradient*).



3. Write a comment here about what you have found, what does it look like?

4. What sort of function have you found? - Can you find the equation of it?
(This is the equation of the gradient function)

5. From your equation and/or graph, predict the gradient at $x = 1.5$
Calculate the gradient on your first graph. Does it match?