

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

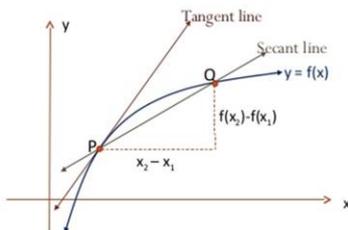
Theoretical Components

Resources:

Maths Quest Year 11 Chapter 8
Rates of Change Notes and Exercises

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 tangent



Average rate of change is the slope of the secant line.

Instantaneous rate of change is the slope of the tangent line at P.

Practical Components

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

<https://mathspace.co/student/tasks/SubtopicCustomTask-1289635/>

Ex 8A Identifying Rates

- Qs 1, 2, 4 (first column), 7

Ex 8B Constant Rates

- Qs 1-3, 6, 8, 12

Ex 8C Variable Rates

- Qs 1, 2, 4, 5

Ex 8D Average Rate of Change

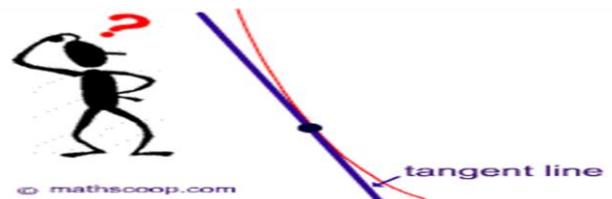
- Qs 1 – 3, 7 – 9

Ex 8E Instantaneous Rate of Change

- Qs 1, 2, 5, 6

Investigation

See the following page.



QFO

Quiz/Forum/Other

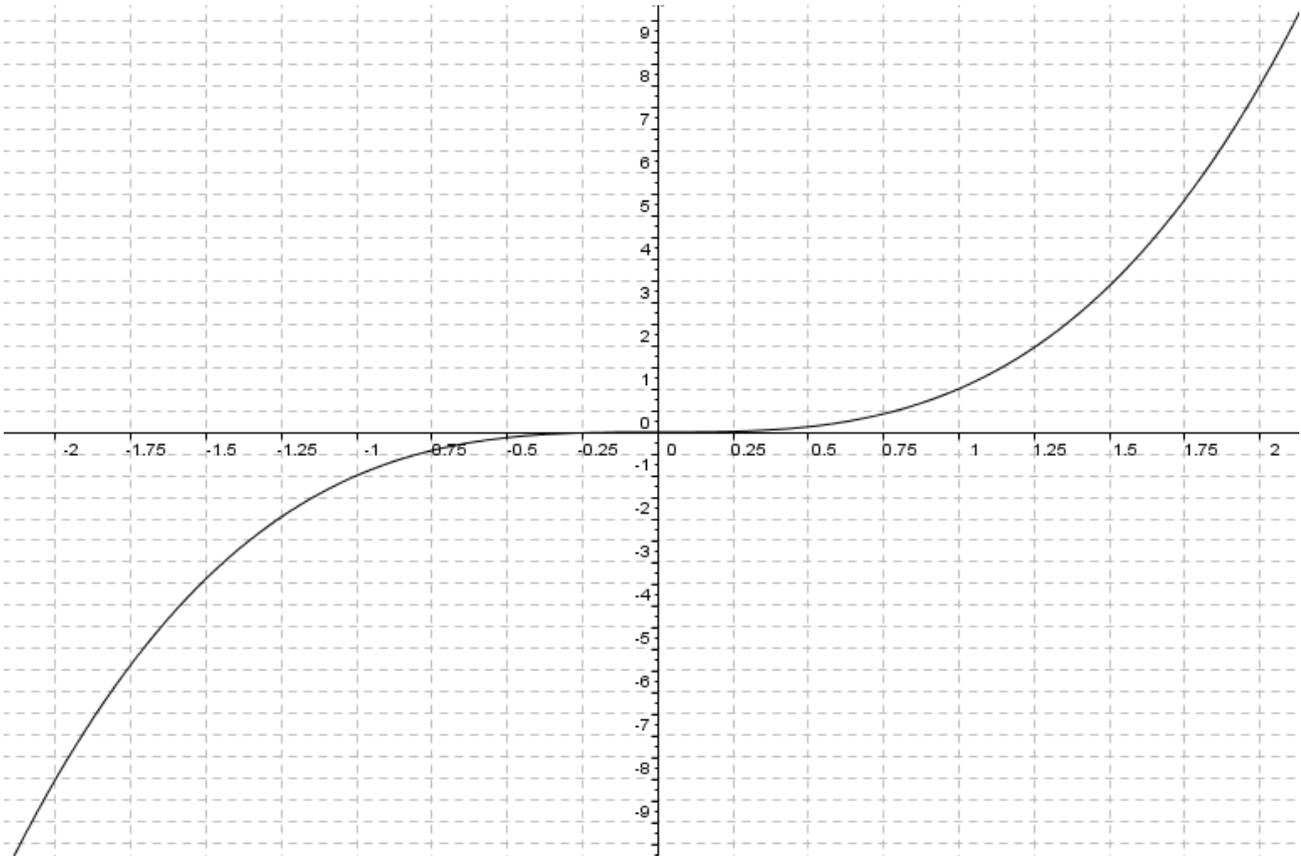
Be prepared for the **TEST** in Week 8. (8.45 am Thursday)
Summary sheet and calculators allowed. Hand-written 2-sided A4 sheet.

Revision – Mathspace Revision -

<https://mathspace.co/student/tasks/CurriculumCustomTask-756425/>

MM2 INVESTIGATION Weeks 7/8

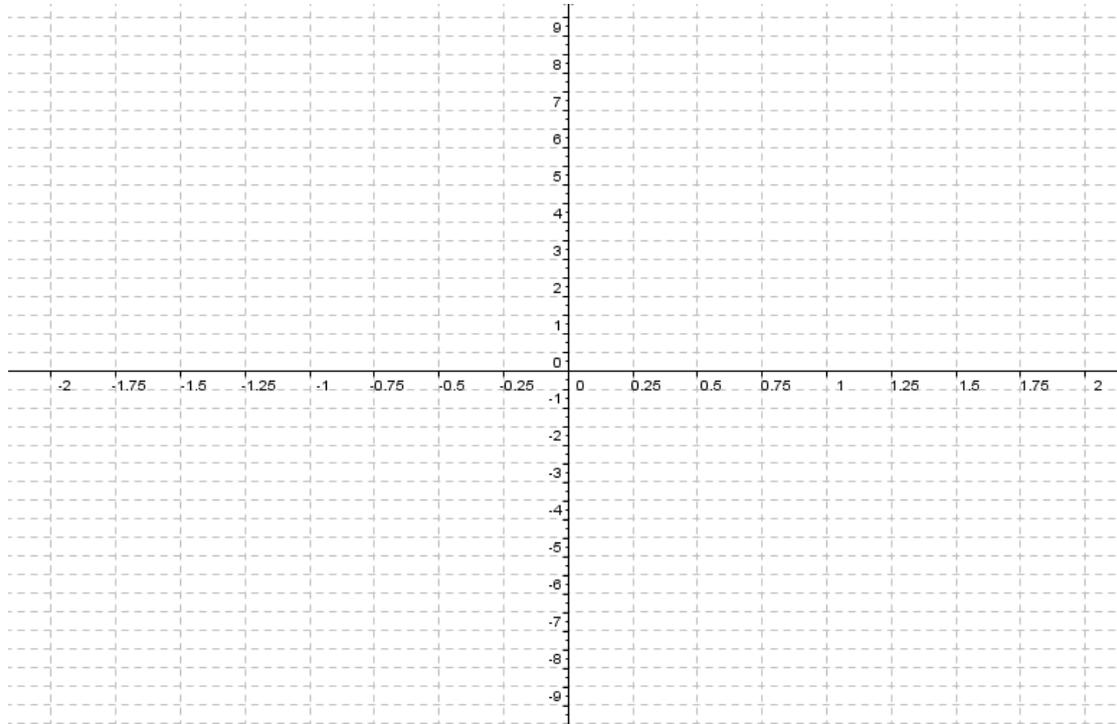
Here is a graph of the cubic function $y = x^3$



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 $(x, \textit{gradient})$.



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?