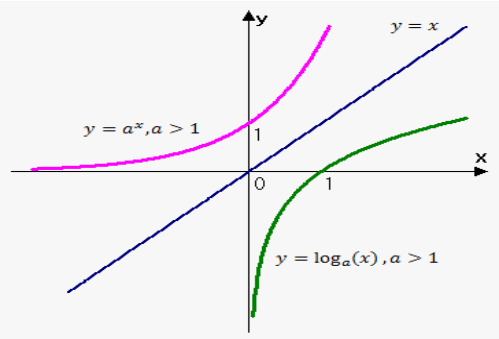
Week 1/2
Term 1
2024

HAWKER COLLEGE
Engage | Inspire | Achieve

SMM3

Goals



This fortnight we are going to:

- Reviewing rate of change, gradient and key features of graphs
- Review index laws and exponential functions
- Define logarithms definition and learn their algebraic properties
- Sketch logarithmic functions
- Solving indicial and logarithmic equations using any base
- Investigate Euler's number
- Use natural logarithms to the base e (Learn notation used)

Theoretical Components

Make notes on the following chapters:

Maths Quest 12 Mathematical Methods

- 3A - The index laws
- 3B - Logarithm laws
- 3C - Exponential equations
- 3D - Logarithmic equations using any base
- 3E - Exponential equations (base e)
- 3F - Equations with natural (base e) logarithms

What is base e?

Learn more about Euler's number. Read through to get an insight on the number 'e':

- https://www.mathopolis.com/questions/q.php?id=2011&site=1&ref=/numbers/e-eulers-number.html&qs=2011_2012_2013
- https://betterexplained.com/articles/an-intuitive-guide-to-exponential-functions-e/

Graphing Logarithmic Functions:

- https://www.youtube.com/watch?v=g9DhlR43P7A
- https://www.youtube.com/watch?v=LqyA96oYtwE

Practical Components

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

Chapter 3 of Maths Quest 12 Mathematical Methods (pdf – Google Classroom)

- 3A: all
- 3B: all
- 3C: all
- 3D: 1-5 (2nd column), 8 (2nd column)
- 3E: 1-3 (2nd and 4th column), 4-6 (2nd column), 7, 8
- 3F: 1-4 (2nd column), 5-10

Portfolio Task

See next page

Other

Make sure you have joined the Google Classroom. If you have not, see your teacher.
Fun fact: The logarithm plays a more fundamental role in mathematics than you might realise, more often than not showing up in places you might not expect. For example, the proportion of positive integers less than x that are prime can be modelled by $\frac{1}{log(x)}$

Week 1 and 2 Investigation

Question 1:

a. Use the change of base rule to show that $\log_{a^x}(b^x) = \log_a(b)$
b. Use your knowledge from part a to simplify:
    i. $\log_{16} 81$
    ii. $\log_{\sqrt{27}} \sqrt{125}$

Question 2:

a. Show that $\log_{ab} x = \frac{\log_a x}{1+\log_a b}$
b. Show that $\log_2 5 = \frac{1-\log_{10} 2}{\log_{10} 2}$