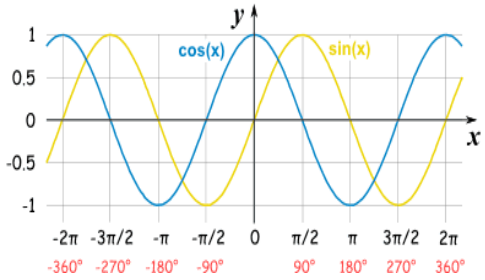
Week 3&4
Term 1
2020

HAWKER COLLEGE
Engage | Inspire | Achieve

Learning Brief MM3:
Further differentiation and applications

Goals



By the end of this week, you should be able to:

- Find the derivatives of trigonometric functions – Sine and Cosine.
- Use the class-pad calculators to find the derivatives of trigonometric functions.
- Learn product and quotient rule
- Use derivatives to solve practical problems

Theoretical Components

STEP 1
Resources:
Maths Quest Year 12 Chapter 7

Derivatives of Sine and Cosine functions
Read and make notes examples 24, 26 from Chapter 7

Product rule
Read and make notes example 27 from Chapter 7

Quotient Rule
Read and make notes examples 29, 30 from Chapter 7

Practical Components

STEP 2
Attempt the following Chapter 7 exercises (Leave out the tan(x) and logarithmic questions for now)

Do **Exercise 7G**
Q1-6, Q10 h, k ,n Q11,12, 13a

Do **Exercise 7H**
Q1, Q3, Q4 j, n, r Q7, Q9

Do **Exercise 7I**
Q1-3, Q5-8

Investigation

STEP 3
Complete the investigation on The Graph of $y = Ne^{kx}$. See next page. Please bring me a neat completed copy of this task by the end of the week 4.

QFO
Quiz/Forum/Other

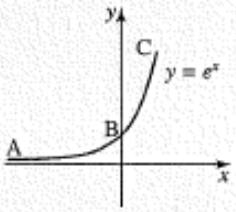
Remember to scan in when you come to the Maths Area and when you leave.

INVESTIGATION

The graph of $y = Ne^{kx}$

The diagram at right shows the graph of $y = e^x$ and uses the letters A, B and C to indicate key parts of the graph.

In this investigation you will use your graphics calculator to observe and report on the effect of changing N and k in the equation $y = Ne^{kx}$.



1 $N = 2$. On the same axes, graph the equations $y = 2e^x$ and $y = e^x$.
In your book, sketch the view window.
Write a sentence summarising the effect of changing N from 1 to 2.

2 $N = -1$. On the same axes, graph the equations $y = -1 \times e^x$ and $y = e^x$.
In your book, sketch the view window.
Write a sentence summarising the effect of changing N from 1 to -1.

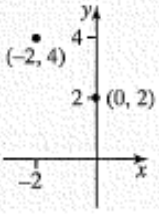
3 $k < 0$. On the same axes, graph the equations $y = e^x$ and $y = e^{-x}$.
In your book, sketch the view window.
Write a sentence summarising the effect of changing k from 1 to -1.

4 $0 < k < 1$. On the same axes, graph the equations $y = e^x$ and $y = e^{0.5x}$.
In your book, sketch the view window.
Write a sentence summarising the effect of changing k from 1 to 0.5.

5 $k > 1$. On the same axes, graph the equations $y = e^x$ and $y = e^{2x}$.
In your book, sketch the view window.
Write a sentence summarising the effect of changing k from 1 to 2.

Challenge

Use your calculator to obtain a guess-and-check solution to the following problem. Find the values of k and N such that the graph of $y = Ne^{kx}$ passes through $(-2, 4)$ and $(0, 2)$, the points shown.



You should complete the above **Challenge** algebraically as well.
You can use https://www.desmos.com/calculator or CAS calculator for your graphs.

(total: 20 marks)