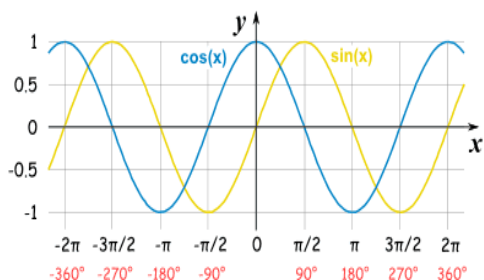


Goals

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

Lesson

<https://mathspace.co/learn/ac-methods-12/calculus-of-trigonometric-functions/basic-derivatives-of-sine-and-cosine-38950/basic-derivatives-of-sine-and-cosine-1940/>

Product rule

Read and make notes example 27 from Chapter 7

Lesson

<https://mathspace.co/learn/ac-methods-12/differentiation/product-rule-38959/product-rule-1966/>

Quotient Rule

Read and make notes examples 29, 30 from Chapter 7

Lesson

<https://mathspace.co/learn/ac-methods-12/differentiation/quotient-rule-38960/quotient-rule-1967/>

Practical Components

STEP 2

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

Do Exercise 7G

(Leave out the tan(x) questions for now)

Do Exercise 7H

Do Exercise 7I

Investigation

STEP 3

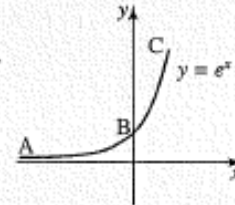
Complete the investigation on The Graph of $y = Ne^{kx}$. See next page. Please bring me a neat completed copy of this task by the end of the week or very early next week.

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.

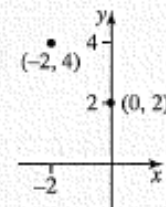
- 5 $k > 1$. On the same axes, graph the equations $y = e^x$ and $y = e^{2x}$.

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.