Vision

Provide skilled professionals in Computer Engineering to contribute towards the advancement of technology useful for society and industrial environment.

Mission

M1.Impart need based and value based education by providing exposure of latest tools and technologies in the area of computer engineering to satisfy the stakeholders.

M2.Upgrade and maintain facilities for quality technical education with continuous effort for excellence in Computer Engineering.

M3. Train students with Computer Engineering knowledge to apply it in the general disciplines of design, deployment of software and integration of existing technologies for E-governance and for benefit of society.

M4. Provide a learning ambience to enhance innovations, problem solving skills, leadership qualities, team spirit and ethical responsibilities.

M5. Provide an academic environment and consultancy services to the industry and society in the area of Computer Engineering.

MICRO-PROJECT REPORT

ON

Prepare a chart showing formulas used in differentiation

In Partial fulfilment of Diploma in Computer Engineering

(Third Semester)

In the subject of

Numerical methods (CM3406)

By

Mr. Ayush Shashikant Bulbule (19CM007)

Submitted To

Government Polytechnic, Amravati

(An Autonomous Institute of Govt. of Maharashtra)

Under the guidance of

Mrs. C.P. Ahir

Lecturer in Numerical Methods (CM3406)

Department of Computer Science & Engg.
Government Polytechnic, Amravati
(2020-2021)

Government Polytechnic, Amravati.

(An Autonomous Institute of Govt. of Maharashtra)

Department of Science & Humanities

Certificate

This is to certify that **Mr. Ayush Shashikant Bulbule** Identity Code. **19CM007**of Third Semester Diploma in Computer Engineering has satisfactorily completed the micro project entitled " prepare a chart showing formulas used in differentiation**.** " in **(CM3406) numerical methods**for the academic year 2020-21 as prescribed in curriculum.

Place: Amravati

Date: 3 /1 /2021

Mrs. C.P.AHIR

Lecturer in **Numerical Methods (CM3406)**

Title of Micro-Project

Prepare a chart showing formulas used in differentiation

1.0 Brief Introduction

Differentiation forms the basic of the calculus and we need its formulas to solve the problems.The operation of differentiation or finding the derivative of a function has the fundamental property of linearity.

So here we have made the chart of the formulas used in differentiation.

2.0 Aim of the Micro-Project

This Micro-Project aims at :

1. Differentiation allows us to find rates of change. For example, it allows us to find the rate of change of velocity with respect to time.
2. To learn the basic derivatives.

3.0 Action Plan (Sequence and time required for major activities for 8 weeks)

S.N.	Details of activity	Planned start date	Planned Finish date	I. Code &Name of Team Members
1	Gathering content	5-12-2020	12-12-2020	Bhagyashree tekade(19CM003)
2	Preparing chart	27-12-2021	9-1-2021	Ayush bulbule(19CM007) Malhar Joshi(19CM033)
3	Making report and file	9-1-2021	19-1-2021	Pratham Gaur (19CM020)
4	Planning proposal submission	13-12-2020	19-12-2020	Akanksha shewatkar (19CM057)

4.0 Resources Required (major resources such as raw material, some machining facility, software etc.)

S.N.	Name of Resource/material	Specifications	Remarks
1	Internet	-	
2	Books	Numerical methods	
3	Pinterest	-	

5.0 Names of Team Members with Identity Codes :

i. Bhagyashree Tekade (19CM003)
ii. Ayush Bulbule (19CM007)
iii. Pratham Gaur (19CM020)
iv. Malhar Joshi (19CM033)
v. Akanksha Shewatkar (19CM057)

Guideline for Assessment of Micro-Project

Evaluation as per suggested Rubric for Assessment of Micro-Project

Assessment Parameter	Characteristic to be assessed	Average (1 mark)	Good (1.5 mark)	Excellent (2 mark)
Process Assessment (06)	Relevance of the courses & proposals			
	Literature survey/market survey/information collection			
	Analysis of data & completion of the target as per proposal/			
Product Assessment (04)	Report Preparation/Quality of Prototype/model			

Title of Micro Project

To prepare the chart showing formulas used in differentiation

1.0 Brief Introduction .

Differentiation forms the basic of the calculus and we need its formulas to solve the problems.The operation of differentiation or finding the derivative of a function has the fundamental property of linearity.

So here we have made the chart of the formulas used in differentiation.

2.0 Aim of the Micro-Project

This Micro-Project aims at:

1) Differentiation allows us to find rates of change. For example, it allows us to find the rate of change of velocity with respect to time.
2) To learn the basic derivatives

3.0 Course Outcomes Integrated

4.0 Actual Procedure Followed

1) Bhagyashree Tekade:

2) Ayush Bulbule:

3) Pratham Gaur:

4) Malhar Joshi:

5) Akanksha Shewatkar:

5.0 Actual Resources used (Mention the actual resources used)

S.N.	Name of Resource/material	Specifications	Remarks
1	Internet	-	
2	Books	Numerical methods	
3	Pinterest	-	

6.0 Output of the Micro-Project

Output of this Micro-Project is attached to this file.

7.0 Skill Developed / Learning outcomes of this Micro-Project

To prepare chart

To learn about differentiation formulas

8.0 Assessment by Faculty as per Rubrics

Process Assessment (06)	Product Assessment (04)	Total Marks (10)	Signature of Faculty

****

What is Differentiation?

Differentiation is a process of looking at the way a function changes from one point to another. Given any function we may need to find out what it looks like when graphed.

Differentiation tells us about the slope (or rise over run, or gradient, depending on the tendencies of your favorite teacher). As an introduction to differentiation we will first look at how the derivative of a function is found and see the connection between the derivative and the slope of the function.

Given the function f (x), we are interested in finding an approximation of the slope of the function at a particular value of x. If we take two points on the graph of the function which are very close to each other and calculate the slope of the line joining them we will be approximating the slope of f (x) between the two points. Our x-values are x and x + h, where h is some small number.

The y-values corresponding to x and x + h are f (x) and f (x + h). The slope m of the line between the two points is given by Where and are the two points. Hence m is called the slope or change which is the differentiation. The primary objects of study in differentiation are the derivative of a function, related notions such as the differential and their applications. The derivate of a function at a chosen input value.

- statement of the problem:

Differentiation is a technique which can be used for analyzing the way in which functions change. In particular, it measures how rapidly a function is changing at any point. This research intends to examine the differential calculus and its various applications in various fields, solving problems using differentiation. This work is to show the important of differentiation, that it is not limited to mathematics alone, it is applied in our day to day life, it has its own share in our sciences

- objective

To show that differentiation is not limited to mathematics alone. · To relate differentiation to velocity and acceleration in motion. · To relate differentiation in calculating rate of change of chemical reactions. · How differentiation affects performance of demand and supply between buyers and sellers in economic.

In Mathematics, Differentiation can be defined as a derivative of a function with respect to an independent variable. Differentiation, in calculus, can be applied to measure the function per unit change in the independent variable.

Let y = f(x) be a function of x. Then, the rate of change of “y” per unit change in “x” is given by:

dy / dx

If the function f(x) undergoes an infinitesimal change of ‘h’ near to any point ‘x’, then the derivative of the function is defined as

Rules of Differentiation

Rules	Function	Derivative
Multiplication by constant	cf	cf'
Power Rule	x^n	nx^{n-1}
Sum Rule	$f + g$	$f' + g'$
Difference Rule	$f - g$	$f' - g'$
Product Rule	fg	$f\,g' + f'\,g$
Quotient Rule	f/g	$(f'\,g - g'\,f)/g^2$
Reciprocal Rule	$1/f$	$-f'/f^2$
Chain Rule (as "Composition of Functions")	$f \circ g$	$(f' \circ g) \times g'$
Chain Rule (using ')	$f(g(x))$	$f'(g(x))g'(x)$
Chain Rule (using $\frac{d}{dx}$)	$\frac{dy}{dx} = \frac{dy}{du}\frac{du}{dx}$	

Chart showing formulas used in differentiation.

Is as follows:

MATHEMATICAL EXPRESSION NAME	EXPLANATION	FORMULAS
1. Basic differentiation formulas	**In all the formulas below, f' means d(f(x))dx=f'(x) and g' means d(g(x))dx = g'(x) . Both f and g are the functions of x and differentiated with respect to x. We can also represent dy/dx = Dx y. Some of the general differentiation formulas are;**	**1.** **Power Rule: (d/dx) (xn) = nxn-1** **2.** **Derivative of a constant, a: (d/dx) (a) = 0** **3.** **Derivative of a constant multiplied with function f: (d/dx) (a. f) = af'** **4.** **Sum Rule: (d/dx) (f ± g) = f' ± g'** **5.** **Product Rule: (d/dx) (fg)= fg' + gf'** **6.** **Quotient Rule:ddx(fg) = gf'– fg'g2**

2. Differentiation formulas for trigonometric functions	**Trigonometry is the concept of relation between angles and sides of triangles. Here, we have 6 main ratios, such as, sine, cosine, tangent, cotangent, secant and cosecant. You must have learned about basic trigonometric formulas based on these ratios. Now let us see, the formulas for derivative of trigonometric functions.**	**1. If f(x) = sin x, then f′(x) = cos x** **2. If f(x) = cos x, then f′(x) = −sin x** **3. If f(x) = tan x, then f′(x) = sec 2 x** **4. If f(x) = cot x, then f′(x) = −csc 2 x.** **5. If f(x) = sec x, then f′(x) = sec x tan x** **6. If f(x) = csc x, then f′(x) = −csc x cot x**
3. Differentiation Formulas for Inverse Trigonometric Functions	**Inverse trigonometry functions are the inverse of trigonemetric ratios. Let us see the formulas for derivative of inverse trigonometric functions.**	$\frac{d}{dx}\left(\sin^{-1}x\right)=\frac{1}{\sqrt{1-x^2}}, x\neq\pm1$ $\frac{d}{dx}\left(\cos^{-1}x\right)=\frac{-1}{\sqrt{1-x^2}}, x\neq\pm1$ $\frac{d}{dx}\left(\tan^{-1}x\right)=\frac{1}{1+x^2}$ $\frac{d}{dx}\left(\cot^{-1}x\right)=\frac{-1}{1+x^2}$ $\frac{d}{dx}\left(\sec^{-1}x\right)=\frac{1}{\lvert x\rvert\sqrt{x^2-1}}, x\neq\pm1,0$ $\frac{d}{dx}\left(\csc^{-1}x\right)=\frac{-1}{\lvert x\rvert\sqrt{x^2-1}}, x\neq\pm1,0$

4. Other Differentiation Formulas	**This formula list includes derivative for constant, trigonometric functions, polynomials, hyperbolic, logarithmic functions, exponential, inverse trigonometric functions etc.**	$\frac{d}{dx}[a^x] = a^x \ln a$ $\frac{d}{dx}[e^x] = e^x$ $\frac{d}{dx}[\log_a^x] = \frac{1}{(lna)x}$ $\frac{d}{dx}(\ln x) = \frac{1}{x}$ **Chain Rule:** $\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$ $\frac{dy}{dx} = \frac{dy}{dv} \times \frac{dv}{du} \times \frac{du}{dx}$

----------×----------