

32 Lecture - MTH101

Important Subjective

What is the second fundamental theorem of calculus?

Answer: The second fundamental theorem of calculus states that if $f(x)$ is a continuous function on the closed interval $[a,b]$ and $F(x)$ is an antiderivative of $f(x)$ on $[a,b]$, then the definite integral of $f(x)$ from a to b can be evaluated as $F(b) - F(a)$.

What is the relationship between the first and second fundamental theorems of calculus?

Answer: The first fundamental theorem of calculus establishes the relationship between derivatives and definite integrals, while the second fundamental theorem of calculus establishes the relationship between definite integrals and antiderivatives.

How can the second fundamental theorem of calculus be used to evaluate definite integrals?

Answer: The second fundamental theorem of calculus can be used to evaluate definite integrals by first finding an antiderivative of the integrand and then plugging in the upper and lower limits of integration to find the difference between the values of the antiderivative at those limits.

What is the significance of the second fundamental theorem of calculus in the applications of calculus?

Answer: The second fundamental theorem of calculus provides a powerful tool for evaluating definite integrals, which is important in many applications of calculus, including physics, engineering, and economics.

What are the conditions required for the second fundamental theorem of calculus to be applicable?

Answer: The second fundamental theorem of calculus is applicable if the function being integrated is continuous on the closed interval $[a,b]$ and has an antiderivative on that interval.

How does the second fundamental theorem of calculus relate to the concept of the area under a curve?

Answer: The second fundamental theorem of calculus can be used to evaluate the area under a curve by finding an antiderivative of the function defining the curve and evaluating it at the upper and lower limits of integration.

What is the difference between the definite integral and the antiderivative of a function?

Answer: The definite integral of a function over an interval represents the area under the curve of the function over that interval, while the antiderivative of a function represents a function whose derivative is equal to the original function.

How does the second fundamental theorem of calculus relate to the concept of accumulation?

Answer: The second fundamental theorem of calculus can be used to express the accumulation of a quantity over a given interval in terms of the antiderivative of the function defining the quantity.

How can the second fundamental theorem of calculus be used to find the average value of a function over an interval?

Answer: The second fundamental theorem of calculus can be used to find the average value of a function over an interval by first evaluating the definite integral of the function over that interval and then dividing by the length of the interval.

What is the importance of the second fundamental theorem of calculus in the development of calculus as a mathematical field?

Answer: The second fundamental theorem of calculus is one of the central results of calculus, and its importance lies in its ability to connect the concepts of derivatives, integrals, and antiderivatives, which are the building blocks of calculus.