

THEORY

1. The first part of the theory discusses the concept of a function and its properties. It covers the domain, codomain, and range of a function, as well as the concept of a mapping. The text explains how a function can be represented by a set of ordered pairs or a graph. It also discusses the concept of a composite function and the inverse of a function.

2. The second part of the theory discusses the concept of a limit and its properties. It covers the concept of a limit of a function as the independent variable approaches a certain value. The text explains how to evaluate limits using various techniques, such as direct substitution, factoring, and rationalization. It also discusses the concept of a limit of a sequence and the relationship between limits and continuity.

PROBLEMS

1. Find the domain and range of the function $f(x) = \sqrt{x-1}$.
2. Evaluate the limit $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2}$.
3. Find the derivative of $y = \sin(x)$ using the first principle.
4. Evaluate the integral $\int_0^1 x^2 dx$.
5. Find the area under the curve $y = x^2$ from $x = 0$ to $x = 1$.

ANSWERS

1. Domain: $x \geq 1$, Range: $y \geq 0$
2. $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2} = 4$
3. $\frac{d}{dx} \sin(x) = \cos(x)$
4. $\int_0^1 x^2 dx = \frac{1}{3}$
5. Area = $\frac{1}{3}$