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① ⇒ Application of Derivative

⇒ Related Rates:

In this section we look at problem that ask for the rate at which some variable changes when it is known how the rate of some related variable changes. The Problem of finding a rate of change from other known rates of change is called Related ~~Change of~~ rates problem.

⇒ Extreme value function:

This section shows how to locate and identify extreme (maximum or minimum) value of a function from its derivates

Finding maximum and minimum value is one of the most important application of Derivative.

Let f be a function with domain D. Then f has a absolute maximum value on D at a point c if

$$f(x) \leq f(c) \quad \text{for all } x \text{ in } D$$

and absolute minimum value on D at c if

$$f(x) \geq f(c) \quad \text{for all } x \text{ in } D.$$

=> First derivative test for local Extrema:

Suppose that c is a critical point of a continuous function f and that f is differentiable at every point in some interval containing c except possibly at c it self.

=> Concavity and Curve sketching:

The graph of a differentiable function $y = f(x)$ is

(a) Concave up: on an open internal I if f is increasing on I.

(b) Concave down on an open internal I if f is decreasing on I.

Application of integration.

In this chapter we explore some of the application of the definite integral by using for.

(i) Computing the area between curves
(ii) Computing the volumes of solids
(iii) Computing the work done by a varying force.
(iv) Computing average value of a function.

The common theme is the following general method. which is similar to the one we used to find areas under curves. We break up a quantity into a larg number of small parts. We next approximate each small part by a quantity of the form $f(x)\Delta x$ and thus approximate A by a Riemann sum.

⇒ Area B/w Two Curves:

Area = $\int_a^b [f(x) - g(x)]\,dx$

Area = $\int_a^b (\text{Top} - \text{Bottom})\,dx$

Example