Salahaddin University-Erbil
College of Engineering
Department of Architectural Engineering
First Year Students
2nd Semester

Mathematics I
Application of Derivative
(Ch.3)

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Application of derivatives

- The most important application of derivative it shows how to calculate the:

1. Rate of change
2. How to graph functions
3. How to find the max. and min. values

3.1. Related Rate of Change:

- It means to find the rate at which some quantity is changing by relating the quantity to some other quantities where rate is known (such that how water level drops or rises while it pumps or drain.)

Example   Pumping Out a Tank

How rapidly will the fluid level inside a vertical cylindrical tank drop if we pump the fluid out at the rate of 3000 l/min.?

Example   A rising balloon

A hot air balloon rising straight up form a level field is tracked by a range finder 500ft from the liftoff point. At the moment the range finder's elevation angel is $\pi/4$, the angle is increasing at the rate of 0.14 rad/min. how fast is the balloon rising at that moment?

3.1. Related Rate of Change:

Example   Filling a Conical Tank

Water runs into a conical tank at the rate of 9 ft³/min. the tank stands point down and has a height of 10 ft and a base radius of 5 ft. how fast is the water level rising when the water is 6 ft deep?

Example

Track A traveling east at 40 km/hr and track B traveling north at 30 km/hr. how fast is the distance between tracks changing when A is 4 km from point of intersection and B is 3 km from the same point?