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

Mathematics I
Chain Rule (Ch.2)

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The Chain Rule

- It's a method used to find the derivative of composite function

Definition: if y is a differentiable function of u and u is differentiable of x, then:

$$\frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$$

The Chain Rule

$$y = (3x + 1)^2$$

$$y = \sin(x^2 - 4)$$

$$x(t) = \cos(t^2 + 1)$$

$$y = (5x^3 - x^4)^7$$

$$y = \cot\left(\pi - \frac{1}{x}\right)$$

$$y = \frac{1}{6}(1 + \cos^2(7t))^3$$

Example

a) Find the slope of the line tangent to the curve $y = \sin^5 x$ at the point where x=π/3

b) Show that the slope of every line tangent to the curve $y = \frac{1}{(1-2x)^3}$ is positive

Next lecture we will learn:

- Implicit Differentiation