

Calculus BC

Section 2.6 - Related Rates

Obj: - To find the rates of change of two or more related variables that are changing with respect to time

1. Suppose x and y are functions of t and are related by the equation $y = x^2 + 3$. Find $\frac{dy}{dt}$ given that $\frac{dx}{dt} = 2$ when $x = 1$.

-differentiate implicitly
w.r.t. time

2. A balloon is being inflated at the rate of $4.5 \text{ ft}^3 / \text{min}$. Find the change in radius at the instant the radius reaches 2 feet.

-identify quantities given
and to be determined

-write equation involving
those variables

-differentiate implicitly

3. A conical tank stands point down and contains some water. Water is leaving the tank such that the height is changing at the rate of -0.2 ft/min and the radius is changing at the rate of -0.1 ft/min. What is the rate of change in the volume of the water when the $r = 2$ ft and $h = 3$ ft?

-identify given quantities
using appropriate notations

-identify wanted quantity

-write an equation relating
the variables of those rates
of change

-differentiate implicitly

-substitute in given quantities