Notes

Examples

Example 1. Find $\frac{\mathrm{d}z}{\mathrm{d}t}$, where $z = \sin(x^2 + y^2)$, $x = 8t^2 + 3$ and $y = 7t^3$.

Example 2. Compute $\frac{\mathrm{d}z}{\mathrm{d}t}$ of

$$z = \frac{4x}{y}$$

where

$$x = e^{-4t} \quad \text{and} \quad y = 4t^2$$

at $t = 1$.

Example 3. The daily revenue from clothing sales at your favorite retailer is given by

$$R(a, w) = 10 + 6a^{3/2}w^{7/3},$$

where a dollars are spent daily on advertising and w dollars are spent daily on employee wages. It is determined that t days from now,

$$a = t^2 + t - 3 \quad \text{and} \quad w = \sqrt{t} - 1.$$

At what rate will the daily revenue be changing 4 days from now?

Example 4. The radius of a right circular cylinder is increasing at a rate of 8 in/min and the height is decreasing at a rate of 13 in/min. What is the rate of change of the surface area when the radius is 17.5 in and the height is 29 in?

Example 5. The monthly demand for a Donald Trump Chia Pet is given by

$$D(x, y) = \frac{1}{200} x e^{\frac{xy}{1000}} \text{ Chia Pets,}$$

where x dollars are spent on infomercials and y dollars are spent on door-to-door sales. If t months from now $x = 80 + t^{2/3}$ dollars are spent on infomercials and $y = \ln(1 + t)$ dollars are spent on door-to-door sales, at approximately what rate will the demand be changing with respect to time 8 months from now?