

Ch. 2.5 Notes Implicit Differentiation

Explicit equations: Equations where x 's and y 's are on ^{separated} different sides of the equation: (example: $y = 9x^2 + 4\sqrt{x} + 3$)
(solved for y)

Implicit equations: Equations where x 's and y 's are mixed together on same side(s) of the equation
(not solved for y) (example: $y^2 = xy - x^2$)

Explicit Differentiation

$$y = 3x^2 - 9x^3 + 5$$

Implicit Differentiation

$$y^2 - 5x = 4$$

Steps:

- 1) Take derivative of each term with respect to x
- 2) If variable is y , find derivative and attach $\frac{dy}{dx}$ to the derivative
- 3) Move all terms containing $\frac{dy}{dx}$ to left side of equation.
- 4) Move all other terms to right side of equation.
- 5) Factor out $\frac{dy}{dx}$ on left side of equation
- 6) Solve for $\frac{dy}{dx}$

Ex. 1 $x^2 - 2y^3 + 4y = 2$ Find $\frac{dy}{dx}$

Ex. 2 $3xy^3 - 2y = 7$ Find $\frac{dy}{dx}$ or y'

Ex. 3 Differentiate $y^2 = 5x$ with respect to t