1. **Evaluate the derivatives**: dx/dt = 4(2) + 3 = 11 and dy/dt = 2(2) - 2 = 2
2. **Find the derivative of y with respect to x**: dy/dx = (2) / (11) = 2/11

Hand-Drawn Plot

Imagine a plot of the parametric curve x(t) = 2t^2 + 3t + 1 and y(t) = t^2 - 2t + 1. At t = 2, the curve has a slope of 2/11, which represents the instantaneous rate of change of y with respect to x.

Code Sample

In Python, we can use the sympy library to calculate the derivative of a parametric function:

```
import sympy as sp


t = sp.symbols('t')

x = 2*t**2 + 3*t + 1

y = t**2 - 2*t + 1


dxdt = sp.diff(x, t)

dydt = sp.diff(y, t)


dydx = dydt / dxdt


print(dydx)
```


This code will output the derivative of y with respect to x as a function of t.

Key Takeaways

- Parametric functions define a curve in terms of a parameter (usually time).
- The derivative of a parametric function represents the instantaneous rate of change of the curve.
- To calculate the derivative, use the chain rule and divide the derivative of y with respect to t by the derivative of x with respect to t

Logarithmic Differentiation: Unlocking the Power of Complex Functions

Imagine you're trying to differentiate a complex function, but it's like trying to untangle a knot - it's frustrating and seems impossible. That's where logarithmic differentiation comes in, a powerful technique that helps you find the derivative of complicated functions with ease.

The Basic Idea