$y = x^2$ find the slope

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1. $\frac{11 - 3x}{x^2 + 2x - 3}$

$\Rightarrow \int \frac{11 - 3x}{x^2 + 2x - 3} \, dx$

From the denominator

$x^2 + 2x - 3 = 0$

$x^2 + 3x - x - 3 = 0$

$x(x - 1)(x + 3) = 0$

$\int \frac{11 - 3x}{x^2 + 2x - 3} \, dx = \int \frac{11 - 3x}{(x - 1)(x + 3)}$

Resolving $\frac{11 - 3x}{(x - 1)(x + 3)}$ into partial fraction:

$\frac{11 - 3x}{(x - 1)(x + 3)} = \frac{A}{(x - 1)} + \frac{B}{(x + 3)}$

$11 - 3x = A(x - 1) + B(x + 3)$

$11 - 3x = Ax - A + Bx + 3B$

$11 = 3B - A$

$-3x = Ax + Bx$

$-3 = A + B$

$A = -3 - B$

$11 = 3B + B + 3$

$11 = 2B + 3$

$2B = 11 - 3$

$2B = 8$

$B = 4$

$A = -2 - 3$

$A = -5$

$\frac{11 + 3x}{(x + 3)(x - 1)} = \frac{-5}{(x + 3)} + \frac{2}{(x - 1)}$

$= \int \frac{-5}{x + 3} \, dx + \int \frac{2}{2x + 1} \, dx$

$= -5 \ln(x + 3) + 2 \ln(x - 1)$

$2 \int \frac{4x - 16}{x^2 - 2x - 3}$

$x^2 - 2x - 3$

$= (x + 3)(x - 1)$

using partial fraction:

$\frac{4x - 16}{(x + 3)(x - 1)} = \frac{A}{(x + 3)} + \frac{B}{(x + 1)}$

$4x - 16 = A(x - 1) + B(x + 3)$

$4x - 16 = Ax - A + Bx + 3B$

$4x = Ax + Bx$

$-16 = -A + 3B$

$A = 3B + 16$

$4 = A + B$

$4 = 3B + 16 + B$

$4 = 4B + 16$

$-12 = 4B$

$B = -3$

$4 = A + 3$

$A = 4 - 3$

$A = -1$

$$\frac{4x - 16}{(x+3)(x-1)} = \frac{1}{(x+3)} + \frac{3}{(x-1)}$$

$$\int \frac{1}{(x+3)}\,dx + \int \frac{3}{(x-1)}\,dx$$

$+1 \ln(x+3) + 3(\ln(x-1)$