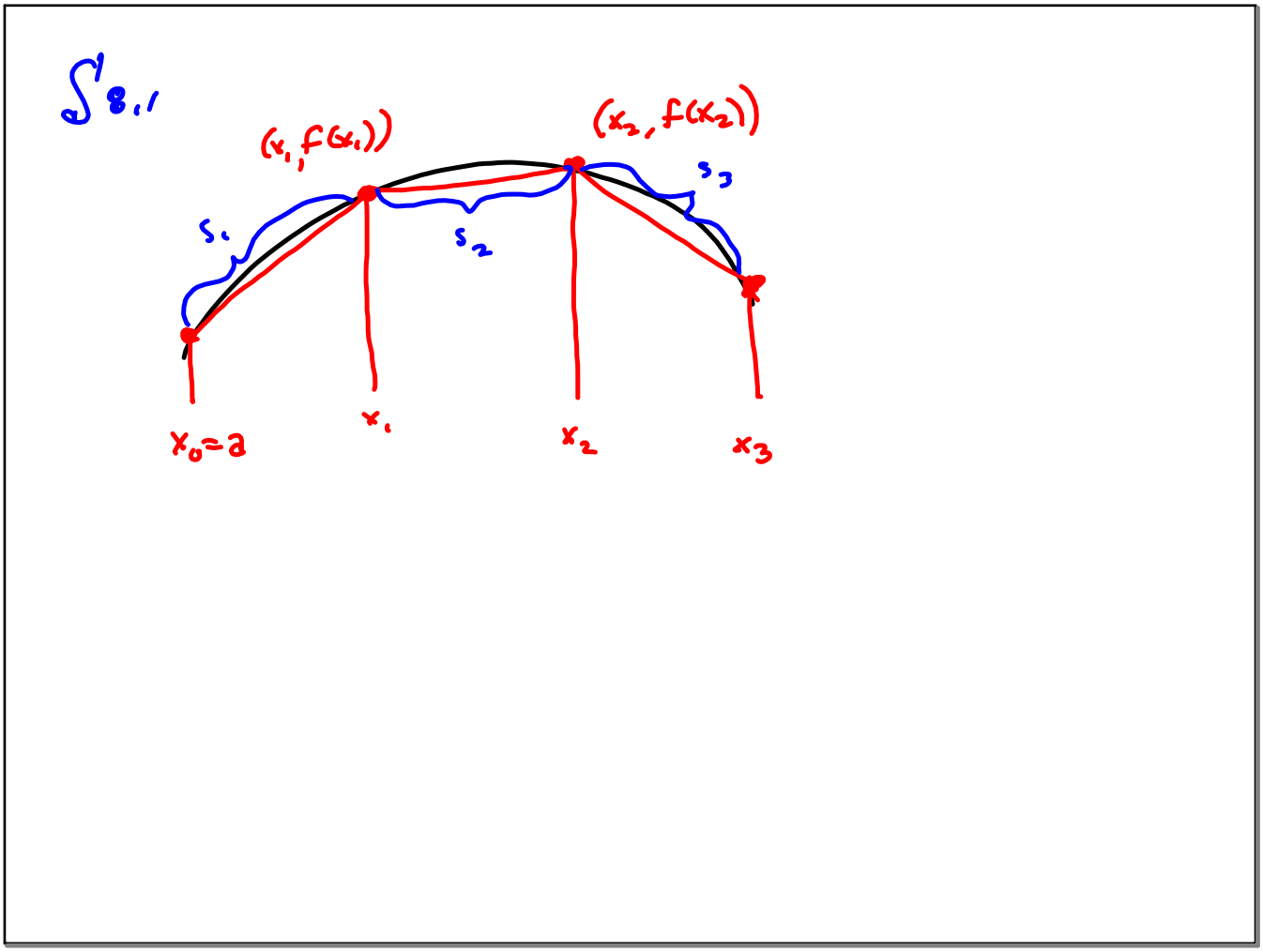

$\int_a^b$
$(x_1, f(x_1))$
$(x_2, f(x_2))$
s_1
s_2
s_3
$x_0 = a$
x_1
x_2
x_3

$$|S_2| = \sqrt{(x_2-x_1)^2 + (f(x_2)-f(x_1))^2}$$

$$= \sqrt{\Delta x^2 + \Delta y^2}$$

$$= \sqrt{\Delta x^2\left(1 + \frac{\Delta y^2}{\Delta x^2}\right)}$$

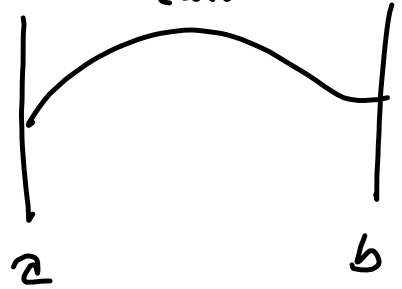
$$= \Delta x \sqrt{1+\left(\frac{\Delta y}{\Delta x}\right)^2}$$

$$\frac{f(x+h)-f(x)}{h}$$

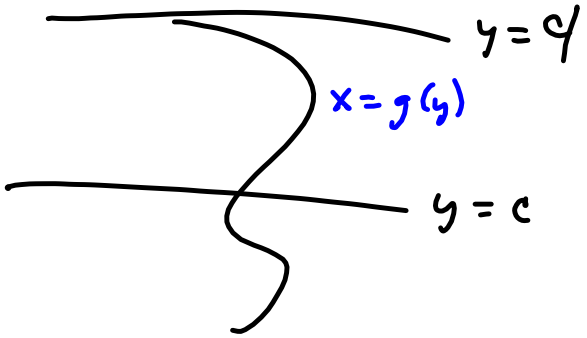
$$\Delta x \to 0 \longrightarrow dx\sqrt{1+f'(x)^2}$$

Suggests $\int_a^b \sqrt{1+f'(x)^2}\,dx$

Length of the curve from a to b.



$x = g(y)$



$$S = \int_c^d \sqrt{1+g'(y)^2}\,dy$$

$$\int \frac{dx}{x^2+3x-28} = \int \frac{dx}{(x+7)(x-4)} = C$$

$$\frac{A}{x+7} + \frac{B}{x-4} = \frac{1}{(x+7)(x-4)}$$

$A(x-4) + B(x+7) = 1$

$x=4 \Rightarrow 11B = 1 \Rightarrow B = \frac{1}{11}$

$x=-7 \Rightarrow -11A = 1 \Rightarrow A = -\frac{1}{11}$

$$\Rightarrow C = -\frac{1}{11}\int \frac{dx}{x+7} + \frac{1}{11}\int \frac{dx}{x-4}$$

$$= \boxed{-\frac{1}{11}\ln|x+7| + \frac{1}{11}\ln|x-4| + K}$$