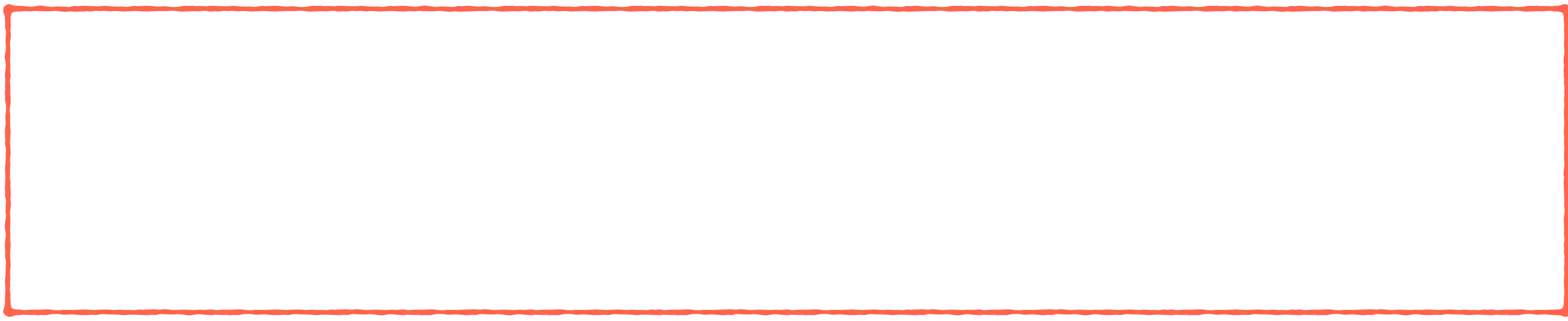




the summer





example

# the sum rule

If  $f$  and  $g$  are differentiable, then

$$\frac{d}{dx} (f(x) + g(x)) = \frac{d}{dx} (f(x)) + \frac{d}{dx} (g(x)) = f'(x) + g'(x)$$

If you repeatedly apply the sum rule, you have

$$\frac{d}{dx} (f_1(x) + f_2(x) + \cdots + f_n(x)) = \frac{d}{dx} (f_1(x)) + \frac{d}{dx} (f_2(x)) + \cdots + \frac{d}{dx} (f_n(x))$$

## example

Differentiate the function  $f(x) = 3x^2 + 4x^3$ .

$$\frac{d}{dx} (x^3 + x^4) = \frac{d}{dx} (x^3) + \frac{d}{dx} (x^4) = 3x^2 + 4x^3$$

a special case