

Special case:

$a, b$  constants

$$F(x) = \int_a^b f(x, t) dt$$

$$\frac{dF}{dx} = \frac{d}{dx} \left[ \int_a^b f(x, t) dt \right]$$

Leibniz's formula

$$\frac{dF}{dx} = \int_a^b \frac{\partial f}{\partial x}(x, t) dt$$

can interchange differentiation and integration