

Let $w = 2 - 3x$. Then $\frac{dw}{dx} = -3$. Also, $\frac{dy}{dx} = \frac{dy}{dw} \frac{dw}{dx}$, so

$$y' = \frac{d}{dx} \int_{2-3x}^2 \frac{u^3}{1+u^2} du = \frac{d}{dw} \int_w^2 \frac{u^3}{1+u^2} du \cdot \frac{dw}{dx}$$
$$= -\frac{d}{dw} \int_2^w \frac{u^3}{1+u^2} du \cdot \frac{dw}{dx} = -\frac{w^3}{1+w^2}(-3) = \frac{3(2-3x)^3}{1+(2-3x)^2}$$