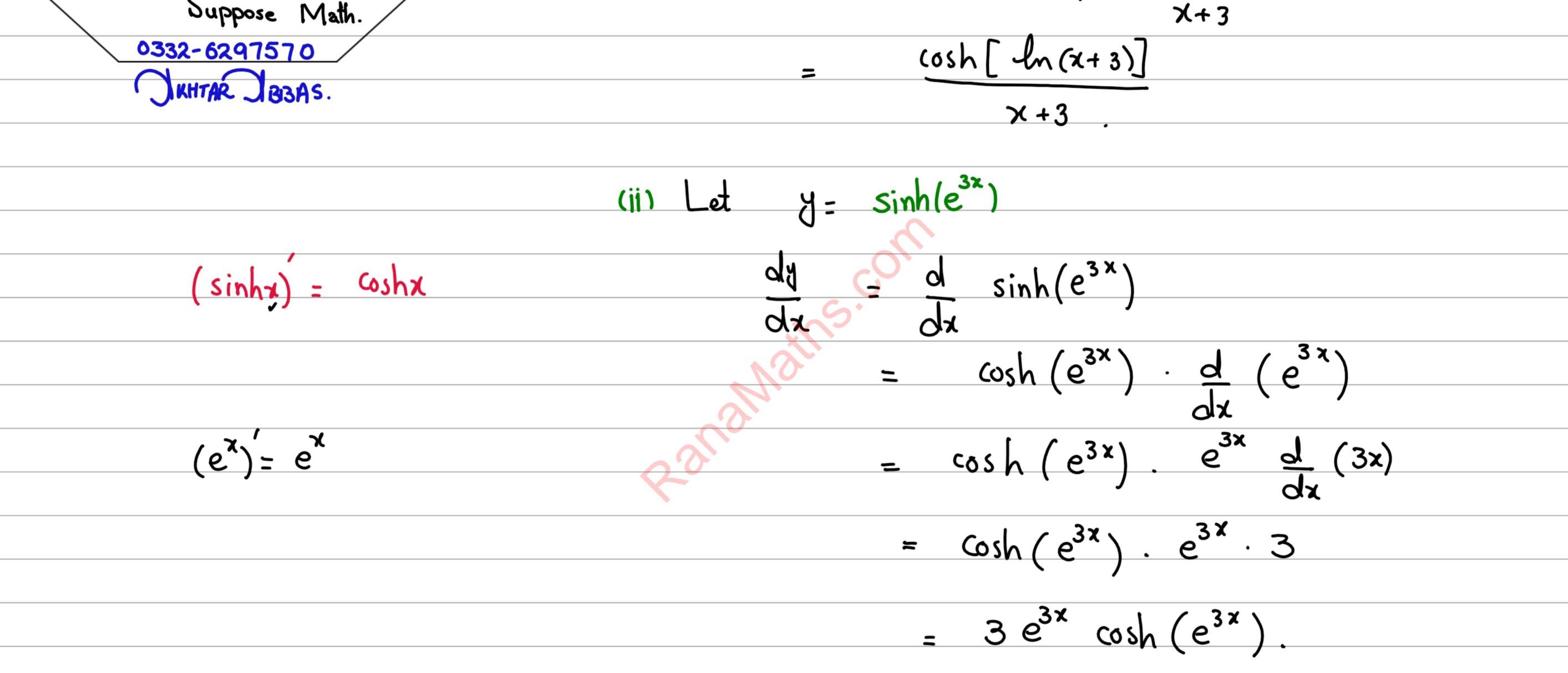


Sr. No	y = f(x)	$\frac{dy}{dx}$
1.	$y = \sinh x^{\checkmark}$	cosh x
2.	$y = \cosh x$	sinh x
3.	$y = \tanh x$	$\operatorname{sech}^2 x$
4.	$y = \coth x$	$-\operatorname{csch}^2 x$
5.	$y = \operatorname{csch} x$	$-\operatorname{csch} x \cdot \operatorname{coth} x$
6.	$y = \operatorname{sech} x$	$-\operatorname{sech} x \cdot \tanh x$
7.	$y = \sinh^{-1} x$	$\frac{1}{\sqrt{x^2+1}}, -\infty < x < \infty$
8.	$y = \cosh^{-1} x$	$\frac{1}{\sqrt{x^2-1}}, x > 1$
Э.	$y = \tanh^{-1} x$	$\frac{1}{1-x^2}, x < 1$
10.	$y = \operatorname{coth}^{-1} x$	$\frac{1}{1-x^2}, x > 1$
11.	$y = \operatorname{csch}^{-1} x$	$-\frac{1}{x\sqrt{1+x^2}}, x > 0$
12.	$y = \operatorname{sech}^{-1} x$	$-\frac{1}{x\sqrt{1-x^2}}, 0 < x < 1$



Exercise # 3.6
Differentiate the following w.r.t. 'x'.
(i) Let
$$y = \sinh[\ln(x+3)]$$

 $\frac{dy}{dx} = \frac{d}{dx} \sinh[-\ln(x+3)]$
 $= (\cosh[-\ln(x+3)] \cdot \frac{d}{dx} \ln(x+3)$
 $= \cosh[-\ln(x+3)] \cdot \frac{1}{x+3} \cdot \frac{d}{dx} (x+3)$
For videos, visit You lube $= (\cosh(-\ln(x+3)) \cdot \frac{1}{x+3} \cdot \frac{1}{dx}$



(iii) Let
$$y = \cosh(2x^2+3x)$$

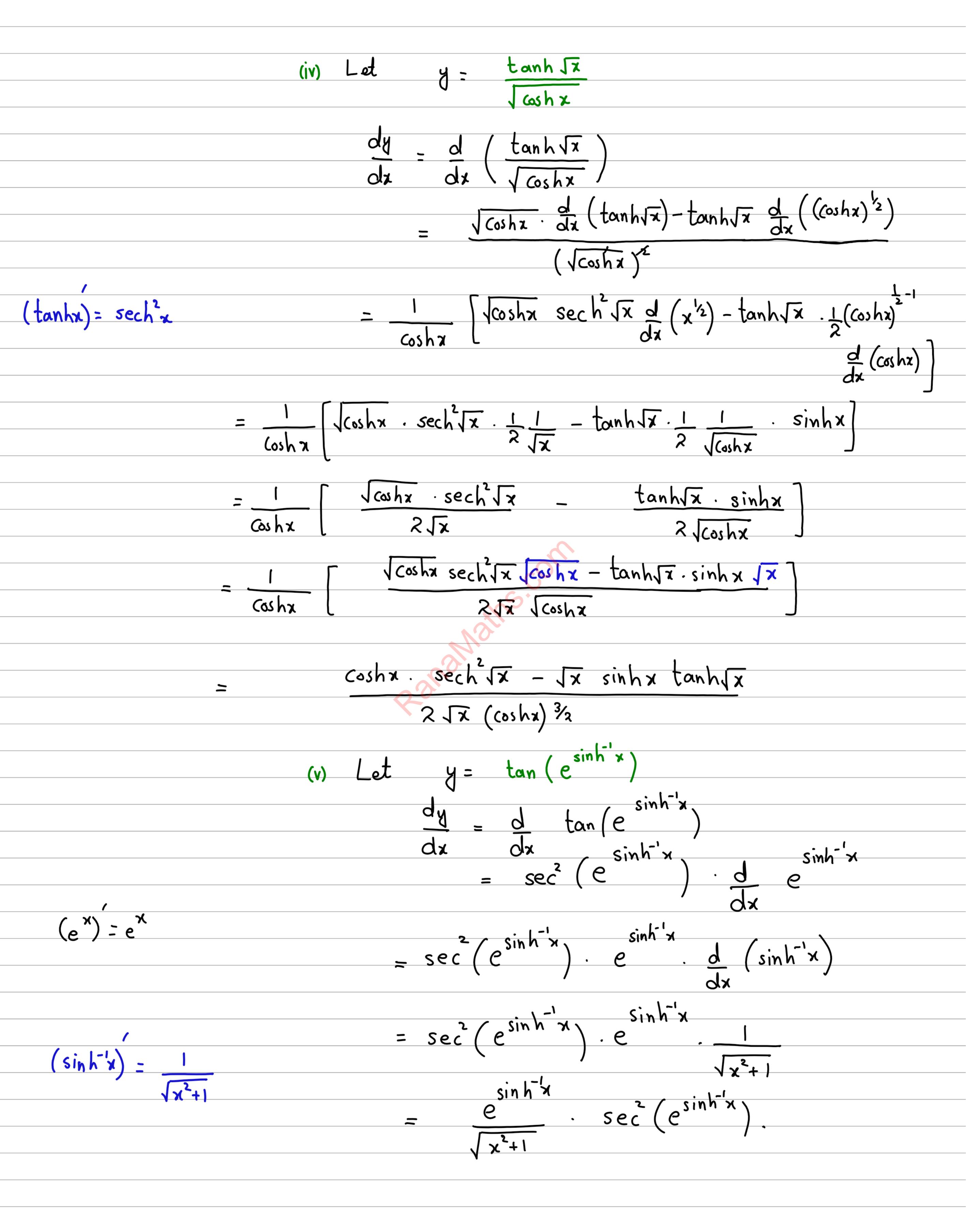
$$\frac{dy}{dx} = \frac{d}{dx} \cosh(2x^2+3x)$$

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

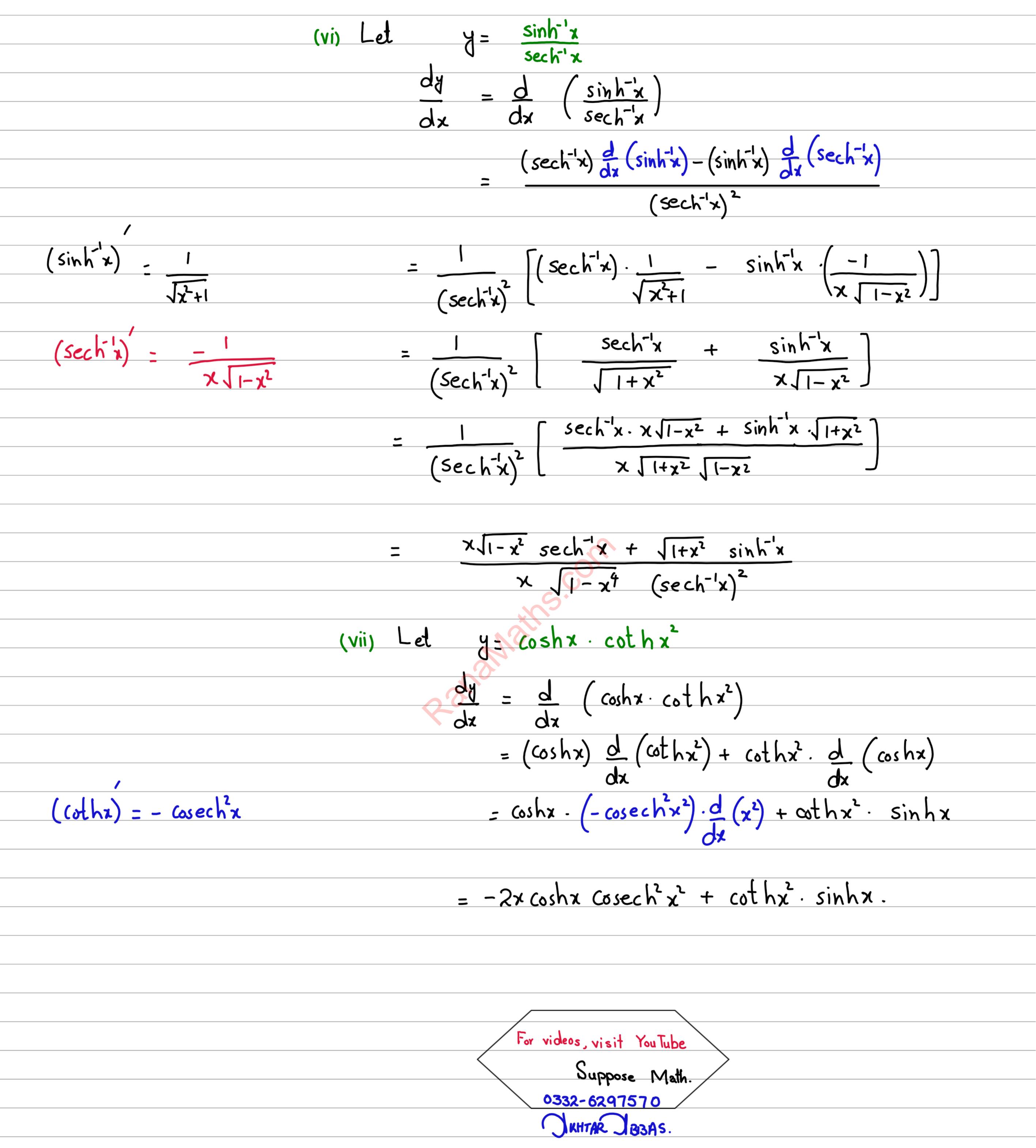
$$= \sinh(2x^2+3x) \cdot (4x+3)$$

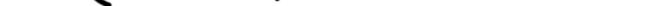
$$= (4x+3) \sinh(2x^2+3x).$$













(viii) Let
$$y = \sinh x \cdot \tanh x^2$$

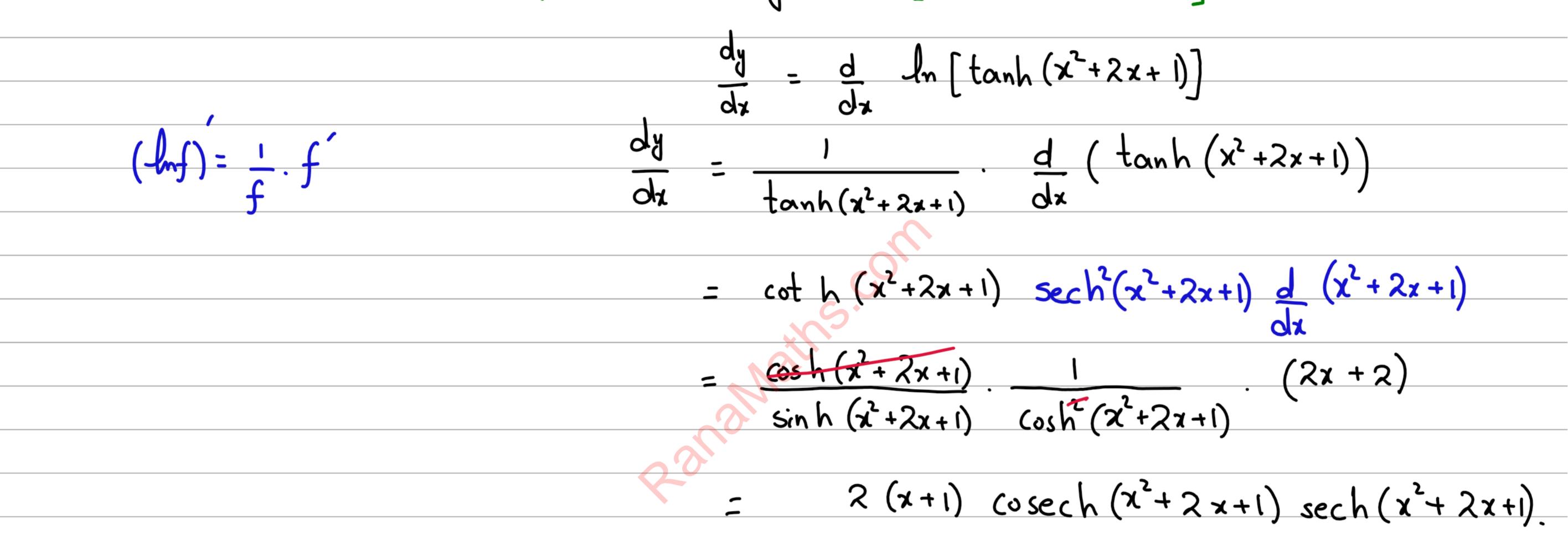
$$\frac{dy}{dx} = \frac{d}{dx} \left(\sinh x \cdot \tanh x^2 \right)$$

$$= (\sinh x) \frac{d}{dx} (\tanh x^2) + \tanh x^2 \cdot \frac{d}{dx} (\sinh x)$$

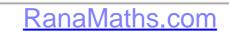
$$= (\sinh x) \left(\operatorname{sech}^2 x^2\right) \frac{d}{dx} (x^2) + \tanh x^2 \cdot \cosh x$$

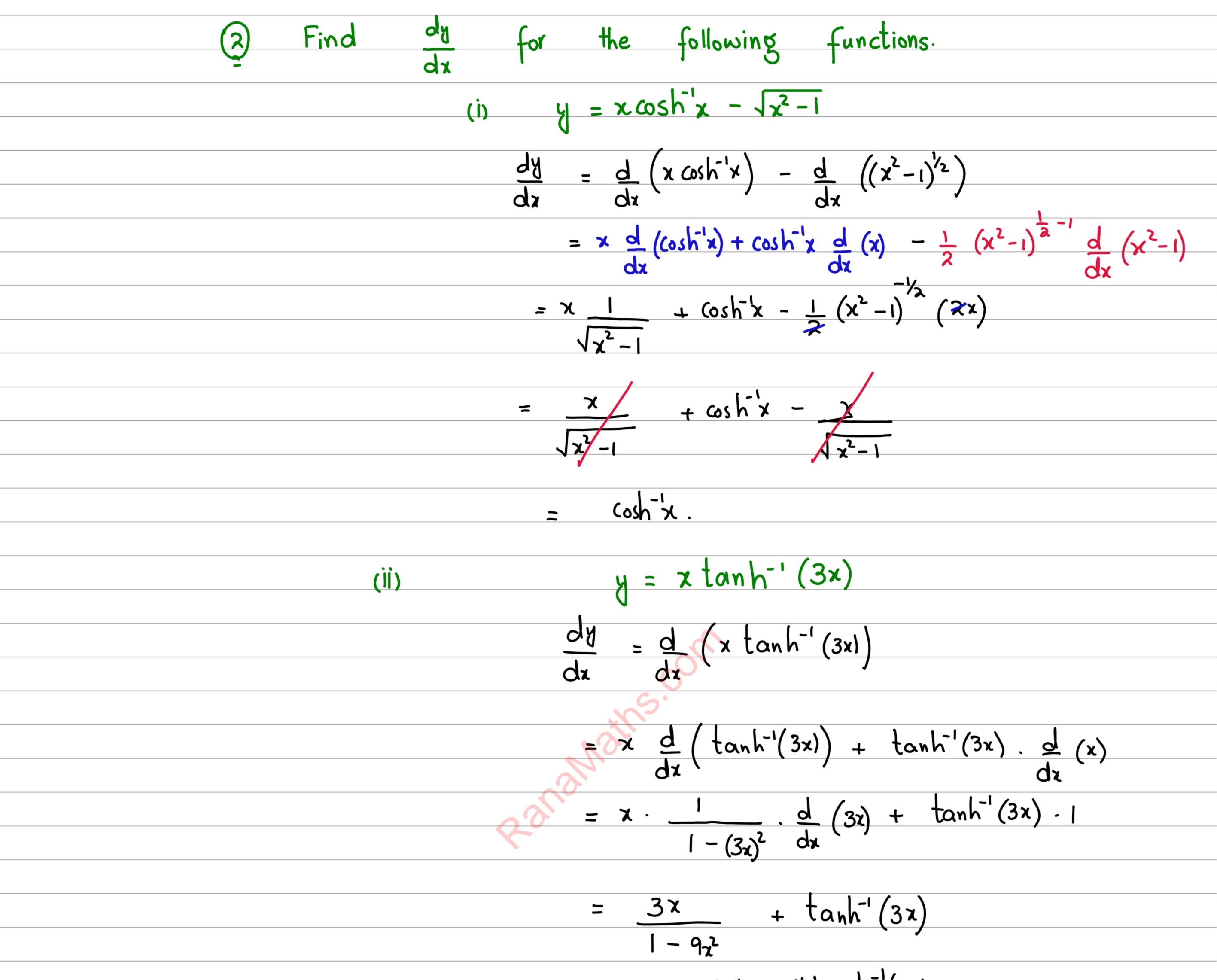
$$= 2x \sinh x \operatorname{sech}^2 x^2 + \tanh x^2 \cosh x \cdot$$

(ix) Let
$$y = ln[tanh(x^2+2x+1)]$$



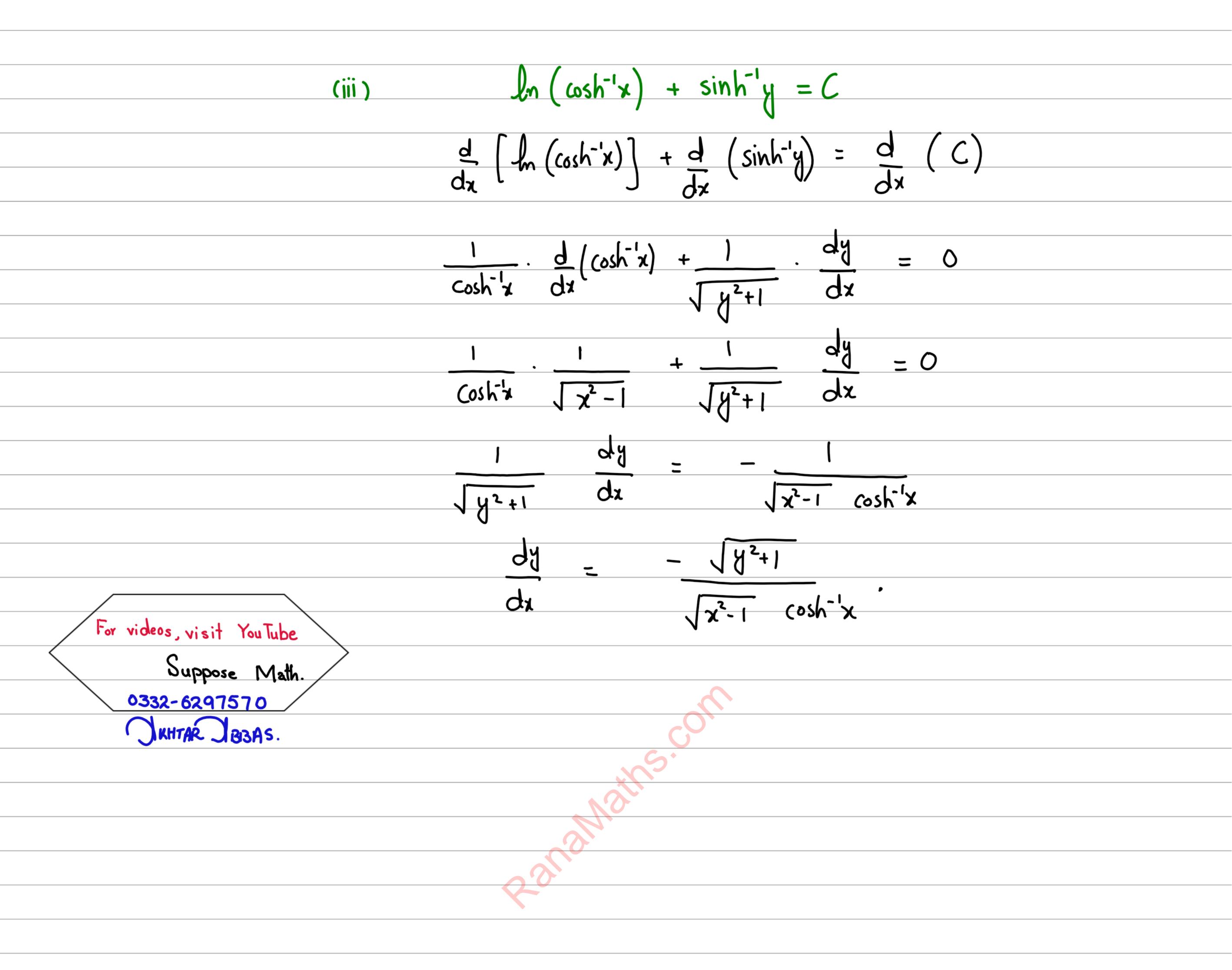




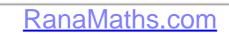


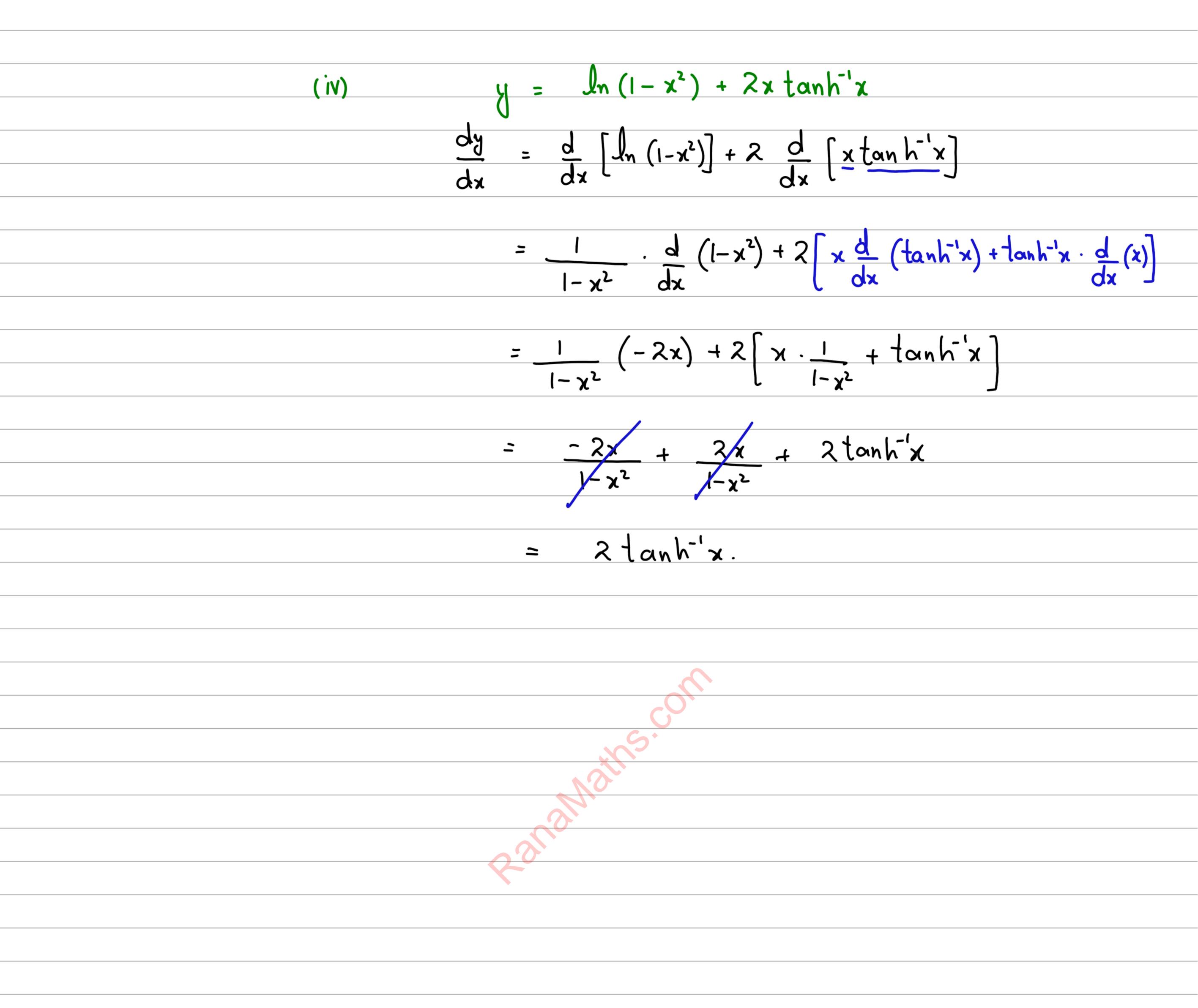
$= \frac{3x + (1 - 9x^2) \tan^{-1}(3x)}{2}$	
$= \underline{-}$	
$1 - 9x^2$	



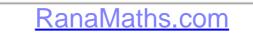












(v)
$$y = \tanh^{-1}(\tan x^{3})$$

 $(-\frac{dy}{dx} = \frac{d}{dx} \left[\tanh^{-1}(\tan x^{3}) \right]$
 $(-\frac{dy}{dx} = \frac{d}{dx} \left[\tanh^{-1}(\tan x^{3}) \right]$
 $= \frac{1}{1-(\tan x^{3})^{2}} = \frac{d}{dx} \left(\tanh^{-3} \right)$
 $= \frac{1}{1-(\tan x^{3})^{2}} = \frac{d}{dx} \left(\tan x^{3} \right)$
 $= \frac{1}{1-(\tan x^{3})^{2}} = \frac{d}{dx} \left(x^{3} \right)$
 $= \frac{1}{1-\tan^{2} x^{3}} = \frac{d}{dx} \left(x^{3} \right)$

