3. $y = \text{arsinh}\left(\sqrt{x^2 - 1}\right) \qquad x > 1$

(a) Prove that $\dfrac{dy}{dx} = \dfrac{1}{\sqrt{x^2 - 1}}$

(3)

$$f(x) = \frac{1}{3}\text{arsinh}\left(\sqrt{x^2 - 1}\right) - \arctan x \qquad x > 1$$

(b) Determine the exact values of x for which $f'(x) = 0$

(4)

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Question 3 continued

(Total for Question 3 is 7 marks)