9. $$y = \operatorname{artanh}\left(\frac{x}{\sqrt{1+x^2}}\right)$$

(a) Show that

$$\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{1}{\sqrt{1+x^2}}$$

(4)

(b) Hence, by integrating the result in part (a), prove that

$$\operatorname{artanh}\left(\frac{x}{\sqrt{1+x^2}}\right) = \operatorname{arsinh} x$$

(2)

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Question 9 continued

Question 9 continued

(Total for Question 9 is 6 marks)

TOTAL FOR PAPER IS 75 MARKS

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