8. (a) Differentiate $x \operatorname{arcosh} 5x$ with respect to x

(2)

(b) Hence, or otherwise, show that

$$\int_{\frac{1}{4}}^{\frac{3}{5}} \operatorname{arcosh} 5x \, \mathrm{d}x = \frac{3}{20} - \frac{2\sqrt{2}}{5} + \ln\left(p + q\sqrt{2}\right)^k - \frac{1}{4}\ln r$$

where p, q, r and k are rational numbers to be determined.

(8)

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(Total for Question 8 is 10 marks)

TOTAL FOR PAPER IS 75 MARKS

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