4. **In this question you must show all stages of your working.**

Solutions relying entirely on calculator technology are not acceptable.

(a) Determine, in ascending powers of $\left(x-\frac{\pi}{6}\right)$ up to and including the term in $\left(x-\frac{\pi}{6}\right)^3$, the Taylor series expansion about $\frac{\pi}{6}$ of

$$y=\tan\left(\frac{3x}{2}\right)$$

giving each coefficient in simplest form.

(7)

(b) Hence show that

$$\tan\frac{3\pi}{8}\approx 1+\frac{\pi}{4}+\frac{\pi^2}{A}+\frac{\pi^3}{B}$$

where A and B are integers to be determined.

(2)

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Question 4 continued

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Question 4 continued

(Total for Question 4 is 9 marks)

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