6 **(a)** Show that $\sin^3 x\left(\frac{\operatorname{cosec} x}{\cot x}\right)$ can be written as $\sin^2 x \tan x$. [3]

(b) Solve the equation $\cos^2 x \tan x - \frac{1}{2}\tan x = 0$ for $-\pi < x < \pi$. [5]

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7 Find the number of different ways the 9 letters of the word POLYMATHS can be arranged when

(a) the O and A are **not** next to each other [2]

(b) the letters MATHS are together in this order. [2]

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