2 **(a)** Evaluate $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \cos\frac{x}{4}\,\mathrm{d}x$. You must show all your working. [4]

(b) Find $\int\left(\frac{1}{4x-3}+\frac{1}{x^3}\right)\mathrm{d}x$. [3]

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3 **(a)** Determine whether the equation $\frac{(4x+1)(3x+2)}{5x-3} = x+1$ has two distinct real roots, two equal roots or no real roots. [4]

(b) Solve the equation $\frac{12}{\sqrt[3]{x}} - \sqrt[3]{x} = 4$. [4]

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