6 **(a)** Find $\int \frac{1}{\sqrt{3x+2}} \mathrm{d}x$. [2]

(b) Find, in terms of a, $\int_{0.5}^{a} \mathrm{e}^{(1-2x)} \mathrm{d}x$. [3]

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7 **(a)** In the expansion of $\left(x+x^2\right)^8$ in ascending powers of x, the 3rd and 6th terms are equal.

Find the value of x. [3]

(b) In the expansion of $\left(x+\frac{2}{x}\right)^n$ in decreasing powers of x, the 6th term is a constant.

(i) Find the value of the positive integer n. [2]

(ii) Find the value of the 6th term. [2]