6 The polynomial $\mathrm{p}(x) = 6x^3 + ax^2 + 6x + b$, where a and b are integers, is divisible by $2x - 1$. When $\mathrm{p}(x)$ is divided by $x - 2$, the remainder is 120.

(a) Find the values of a and b. [4]

(b) Hence write down the remainder when $\mathrm{p}(x)$ is divided by x. [1]

(c) Find the value of $\mathrm{p}''(0)$. [2]

7 **(a)** Show that $\frac{2}{2x+3}-\frac{1}{x-1}+\frac{1}{(x-1)^2}$ can be written as $\frac{8-3x}{(x-1)^2(2x+3)}$. [2]

(b) Find $\int_2^a \frac{8-3x}{(x-1)^2(2x+3)}\mathrm{d}x$ where $a > 2$. Give your answers in the form $c+\ln d$, where c and d are functions of a. [6]