**7** $\mathrm{p}(x) = ax^3 + 3x^2 + bx - 12$ has a factor of $2x + 1$. When $\mathrm{p}(x)$ is divided by $x - 3$ the remainder is 105.

**(a)** Find the value of $a$ and of $b$. [5]

**(b)** Using your values of $a$ and $b$, write $\mathrm{p}(x)$ as a product of $2x + 1$ and a quadratic factor. [2]

**(c)** Hence solve $\mathrm{p}(x) = 0$. [2]