11. **In this question you must show all stages of your working.**
Solutions relying on calculator technology are not acceptable.

(a) Use the substitution $u = \sqrt{5x - 2}$ to show that

$$\int_{\frac{3}{5}}^{\frac{27}{5}} \frac{1}{3 + \sqrt{5x - 2}} \, \mathrm{d}x = k \int_{p}^{q} \frac{u}{3 + u} \, \mathrm{d}u$$

where k, p and q are constants to be found and $q > p$.

(4)

(b) Hence, using algebraic integration, show that

$$\int_{\frac{3}{5}}^{\frac{27}{5}} \frac{1}{3 + \sqrt{5x - 2}} \, \mathrm{d}x = A + B \ln 2$$

where A and B are simplified rational constants to be found.

(4)