**10** A curve with equation $y = \mathrm{f}(x)$ is such that $\frac{\mathrm{d}^2y}{\mathrm{d}x^2} = \left(2x+3\right)^{-\frac{1}{2}} + 5$ for $x > 0$. The curve has gradient 10 at the point $\left(3, \frac{19}{2}\right)$.

**(a)** Show that, when $x = 11$, $\frac{\mathrm{d}y}{\mathrm{d}x} = 52$. [5]

**(b)** Find $\mathrm{f}(x)$. [4]

**11** A curve has equation $y = \dfrac{\left(x^2 - 5\right)^{\frac{1}{3}}}{x + 1}$ for $x > -1$.

**(a)** Show that $\dfrac{\mathrm{d}y}{\mathrm{d}x} = \dfrac{Ax^2 + Bx + C}{3\left(x + 1\right)^2\left(x^2 - 5\right)^{\frac{2}{3}}}$ where $A$, $B$ and $C$ are integers. [6]