10 Functions f and g are defined by

$$\mathrm{f} : x \mapsto 2x + 1, \quad x \in \mathbb{R}, \ x > 0,$$
$$\mathrm{g} : x \mapsto \frac{2x - 1}{x + 3}, \quad x \in \mathbb{R}, \ x \neq -3.$$

(i) Solve the equation $\mathrm{gf}(x) = x$. [3]

(ii) Express $\mathrm{f}^{-1}(x)$ and $\mathrm{g}^{-1}(x)$ in terms of x. [4]

(iii) Show that the equation $\mathrm{g}^{-1}(x) = x$ has no solutions. [3]

(iv) Sketch in a single diagram the graphs of $y = \mathrm{f}(x)$ and $y = \mathrm{f}^{-1}(x)$, making clear the relationship between the graphs. [3]