

(i) Let $k \neq \pm 1$. The function $f(t)$ satisfies the identity

$$f(t) - kf(1 - t) = t$$

for all values of t . By replacing t with $1 - t$, determine $f(t)$.

(ii) Consider the new identity

$$f(t) - f(1 - t) = g(t). \tag{*}$$

(a) Show that no function $f(t)$ satisfies (*) when $g(t) = t$.

(b) What condition must the function $g(t)$ satisfy for there to be a solution $f(t)$ to (*)?

(c) Find a solution $f(t)$ to (*) when $g(t) = (2t - 1)^3$.