

8. A curve  $C$  has equation  $y = g(x)$ .

Given that

- $g'(x) = 6x^2 + 5x + k$  where  $k$  is a constant
- the graph of  $C$  cuts the  $y$ -axis at  $(0, -10)$
- $(x + 4)$  is a factor of  $g(x)$

find  $g(x)$  in simplest form.