You *MAY* use your calculators.

x	$f(x)$	$f'(x)$	g(x)	$g'(x)$
1	6	4	2	5
2	9	2	3	1
3	10	-4	4	2
4	-1	3	6	7

The functions f and g are differentiable for all real numbers, and g is strictly increasing. The table above gives values of the functions and their derivatives at selected values of x. The function h is given by $h(x) = f(g(x)) - 6$.

(a) Explain why there must be a value r for $1 < r < 3$ such that $h(r) = -5$.

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(b) Explain why there must be a value c for $1 < c < 3$ such that $h'(c) = -5$.

(c) Let w be the function given by $w(x) = \int_1^{g(x)} f(t)\, dt$. Find the value of $w'(3)$

(d) If g^{-1} is the inverse of g, write an equation for the line tangent to the graph of $y = g^{-1}(x)$ at $x = 2$.