DATE: ______________

Inverse Derivatives Practice

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

1. The functions f and g are differentiable for all real numbers, and g is strictly increasing. The table shows given values of the functions and their first derivatives at selected values of x.

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

$y - y_1 = m(x - x_1)$

$\boxed{y - 1 = \frac{1}{5}(x - 2)}$

$y \to g^{-1}(2)$

$m \to (g^{-1})'(2)$

$g(1) = 2$ $\quad (g^{-1})(2) = 1$

$g'(1) = 5$ $\quad (g^{-1})'(2) = \frac{1}{5}$

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x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
-1	3	-2	2	6
0	-2	-1	0	-3
1	0	1	-1	2
2	-1	4	3	-1

2. The functions f and g are differentiable for all real numbers. The table shows gives the values of the functions and their first derivatives at selected values of x.

Let $h(x)$ be the function given by $h(x) = f(g(x))$. Find $(h^{-1})'(3)$, if h^{-1} is the inverse of h.

$h(1) = 3$ $\quad h^{-1}(3) =$

$h'(1) = -4$ $\quad \boxed{(h^{-1})'(3) = -\frac{1}{4}}$

$h(?) = 3$

$h(?) = f(g(?)) = 3$

$= f(-1) = 3$

so, $g(?) = -1$

$g(1) = -1$

so, $h(1) = f(g(1)) = f(-1)$
$= 3$

$h'(x) = g'(x) \cdot f'(g(x))$

$h'(1) = g'(1) \cdot f'(g(1))$

$= 2 \cdot f'(-1)$

$= 2 \cdot -2$

$= -4$