Show all work for each problem.

①

x	$f(x)$	$g(x)$	$f'(x)$
−4	0	−9	5
−2	4	−7	4
0	6	−4	2
2	7	−3	1
4	10	−2	3

The table above gives values of the differentiable functions f and g, and f', the derivative of f, at selected values of x. If $g(x) = f^{-1}(x)$, what is the value of $g'(4)$?

(A) $-\dfrac{1}{3}$　　　(B $-\dfrac{1}{4}$　　　(C) $-\dfrac{3}{100}$　　　(D $\dfrac{1}{4}$　　　(E) $\dfrac{1}{3}$

② Let f be the function defined by $f(x) = x^3 + x$. If $g(x) = f^{-1}(x)$ and $g(2) = 1$, what is the value of $g'(2)$?

(A) $\dfrac{1}{13}$　　　(B) $\dfrac{1}{4}$　　　(C) $\dfrac{7}{4}$　　　(D) 4　　　(E) 13

over　⟶

(3) Let f be a differentiable function such that $f(3) = 15$, $f(6) = 3$, $f'(3) = -8$, and $f'(6) = -2$. The function g is differentiable and $g(x) = f^{-1}(x)$ for all x. What is the value of $g'(3)$?

(A) $-\dfrac{1}{2}$

(B) $-\dfrac{1}{8}$

(C) $\dfrac{1}{6}$

(D) $\dfrac{1}{3}$

(E) The value of $g'(3)$ cannot be determined from the information given.

(4) The functions f and g are differentiable, and $f(g(x)) = x$ for all x. If $f(3) = 8$ and $f'(3) = 9$, what are the values of $g(8)$ and $g'(8)$?

(A) $g(8) = \dfrac{1}{3}$ and $g'(8) = -\dfrac{1}{9}$

(B) $g(8) = \dfrac{1}{3}$ and $g'(8) = \dfrac{1}{9}$

(C) $g(8) = 3$ and $g'(8) = -9$

(D) $g(8) = 3$ and $g'(8) = -\dfrac{1}{9}$

(E) $g(8) = 3$ and $g'(8) = \dfrac{1}{9}$