

3.3 Differentiating Inverse Functions

Calculus

Name: _____

CA #2

For each problem, let f and g be differentiable functions where $g(x) = f^{-1}(x)$ for all x .

1. $f(4) = 2, f(-1) = 6,$
 $f'(4) = -5, f'(-1) = -3.$
Find $g'(6)$.

2. $f(-8) = -10, f(-2) = -4,$
 $f'(-8) = 7,$ and $f'(-2) = 5.$
Find $g'(-10)$.

The table below gives values of the differentiable function g and its derivative g' at selected values of x .
Let $h(x) = g^{-1}(x)$.

x	$g(x)$	$g'(x)$
-9	17	-6
-5	-9	4
0	-5	-2
10	0	9
17	10	-8

3. Find $h'(10)$

Find the equation of the tangent line to g^{-1} at $x = 10$.

4. $h'(-5)$

Find the equation of the tangent line to g^{-1} at $x = -5$.

For each function $g(x)$, its inverse $g^{-1}(x) = f(x)$. Evaluate the given derivative.

5. $g(x) = \sqrt{2x + 1}$. Find $f'(3)$?

6. $g(x) = x^3 + 4$. Find $f'(12)$?

f and g are differentiable functions. Use the table to answer the problems below. f and g are NOT inverses!

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
5	6	-2	6	-5
6	9	2	5	-4
7	8	-10	10	9
8	10	4	9	2
9	5	5	7	10
10	7	7	8	6

7. $g^{-1}(7)$

8. $f^{-1}(7)$

9. $\frac{d}{dx}f^{-1}(6)$

10. $\frac{d}{dx}g^{-1}(8)$

11. Find the line tangent to the graph of $g^{-1}(x)$ at $x = 5$.

Answers to 3.3 CA #2

1. $-\frac{1}{3}$	2. $\frac{1}{7}$	3. $-\frac{1}{8}$ $y - 17 = -\frac{1}{8}(x - 10)$	4. $-\frac{1}{2}$ $y = -\frac{1}{2}(x + 5)$	5. 3	6. $\frac{1}{12}$
7. 9	8. 10	9. $-\frac{1}{2}$	10. $\frac{1}{6}$	11. $y - 6 = -\frac{1}{4}(x - 5)$	