

3.3 Differentiating Inverse Functions

Calculus

Name: _____

CA #1

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

1. $f(7) = -2$, $f(-5) = 1$,
 $f'(7) = -1$, $f'(-5) = 8$.
Find $g'(-2)$.

2. $f(6) = -8$, $f(-5) = 1$,
 $f'(6) = 3$, and $f'(-5) = 6$.
Find $g'(1)$.

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	$g(x)$	$g'(x)$
2	5	3
4	7	-2
5	10	11
7	2	-7
10	4	6

3. Find $h'(2)$

Find the equation of the tangent line to g^{-1} at $x = 2$.

4. $h'(7)$

Find the equation of the tangent line to g^{-1} at $x = 7$.

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

5. $g(x) = \sqrt{4x + 4}$. Find $f'(6)$?

6. $g(x) = \frac{1}{5-x}$. Find $f'(\frac{1}{3})$?

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

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

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

8. $f^{-1}(-5)$

9. $\frac{d}{dx}g^{-1}(-2)$

10. $\frac{d}{dx}f^{-1}(-3)$

11. Find the line tangent to the graph of $f^{-1}(x)$ at $x = -4$.

Answers to 3.3 CA #1

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