



Problem Set 14: Inverse Functions

1. Where are the functions strictly monotonic?

a) $y = x^3$

b) $y = 2x^2 - 4x - 7$

2. Find the inverse of the function.

a) $f(x) = x + 3$

b) $f(x) = x^{1/5} - 10$



3. State whether the functions are inverses of each other.

a) $f(x) = \frac{3x-1}{2}$ and $g(x) = \frac{2x+1}{3}$

b) $f(x) = x^2 - 1$ and $g(x) = \sqrt{x+1}$

4. Given $f(x)$, find the slope of $f^{-1}(x)$ at the given point. (Hint: you don't need to find $f^{-1}(x)$ to find its slope)

a) $f(x) = 3x^3 - x$. Find the slope of $f^{-1}(x)$ at the point (2,1).

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b) $f(x) = x^{1/3} + 3$. Find the slope of $f^{-1}(x)$ at the point (5,8).

5. For the following problems, $f(x)$ and $g(x)$ are inverses of each other.

a) $f(2) = 5, f'(2) = \frac{1}{2}, f(4) = 2, f'(4) = 3, g(2) = 4, g(4) = 10$.

What is $g'(2) = ?$

b) $f(-1) = 0, f'(-1) = 3, f(1) = 9, f'(1) = 0, g(-1) = 3, g(0) = -1$.

What is $g'(0) = ?$

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6. Use the table to find the following quantities:

a) $f^{-1}(10)$

b) $f^{-1}(2)$

c) $(f^{-1})'(8)$

d) $(f^{-1})'(0)$

x	$f(x)$	$f'(x)$
-5	0	2
-3	2	12
0	8	0
2	10	$1/3$

7. Use the table to find the following quantities:

a) $f^{-1}(2)$

b) $f^{-1}(6)$

c) $f'(6)$

d) $(f^{-1})'(6)$

x	$f(x)$	$f'(x)$
9	18	$4/3$
6	11	7
3	6	2
2	2	6