AP Calculus AB – Unit 3

Problem Set 14: Inverse Functions

1. Where are the functions strictly monotonic?

a)
$$y = x^3$$

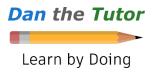
b)
$$y = 2x^2 - 4x - 7$$

2. Find the inverse of the function.

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

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

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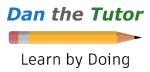
3. State whether the functions are inverses of each other.

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