

Lesson 3.6

The Derivative of Inverse Functions

1. Complete the table.

Original Function			Inverse Function		
x	f(x)	f'(x)	x	g(x)	g'(x)
1	3	5	3	1	
7	-2	$\frac{1}{2}$	-2		
-6	3	10		-6	

2. Complete the table. Use exact values.

Original Function				Inverse Function			
Function	x	f(x)	f'(x)	Function	x	g(x)	g'(x)
$\sin x$	$\frac{\pi}{3}$			$\arcsin x$		$\frac{\pi}{3}$	
e^x	1			$\ln x$		1	
x^2	3			$\sqrt{x}$		3	

3. Let $f(x) = x^3 + 2x - 1$ and let g be the inverse function of f . Notice that $f(2) = 11$. Find $g'(11)$.
4. Let $h(x) = 5 - x - x^3$ and let f be the inverse function of h . Notice that $h(-1) = 7$. Find $f'(7)$.
5. Let $f(x) = e^x$, and let g be the inverse of f . Find the value of $g'(1)$.
6. Let $f(x) = 4x - x^3$ and let g be the inverse of f . Find the value of $g'(15)$.

For problems 7 – 9,

- Find $f(c)$.
 - Find $f'(c)$.
 - Find $g'(f(c))$.
7. $f(x) = 2x + 3$ $c = -1$
8. $f(x) = x^2 + 1$ for $x \geq 1$ $c = 5$
9. $f(x) = (x - 1)^2$ for $x \geq 1$ $c = 4$