Name . . . . *Solution Key* . . . .

Quiz 5—Friday, March 6

1. (*4 points*) Two functions f and g have values as given in the table on the right. Evaluate (and simplify) the following derivatives.

x	1	2	3	4	5
$f(x)$	3	0	4	10	6
$f'(x)$	7	10	4	4	3
$g(x)$	5	6	0	0	2
$g'(x)$	11	9	8	6	−1

a. If $h(x) = f(g(x))$ then $h'(1) = f'(g(1))g'(1) = f'(5) \cdot 11 = 3 \cdot 11 = 33$

b. If $S(x) = g(f(x))$ then $S'(1) = g'(f(1))f'(1) = g'(3) \cdot 7 = 8 \cdot 7 = 56$

c. If $U(x) = f(x^2)$ then $U'(1) = 2 \cdot 1 \cdot f'(1) = 2 \cdot 7 = 14$

$U'(x) = 2x f'(x^2)$

d. If $m(x) = g(g(x))$ then $m'(1) = g'(g(1)) g'(1) = g'(5) \cdot 11$
$$= -1 \cdot 11 = -11$$

2. (*3 points*) Evaluate (but do not simplify) the derivative:

$$\frac{d}{dx} \sin(x^2) = \cos(x^2) \cdot 2x = 2x \cos(x^2)$$

3. (*3 points*) Evaluate (but do not simplify) the derivative:

$$\frac{d}{dx} \sin^2(x + 5) = 2\sin(x+5) \cos(x+5)$$