3. (12 pts.) Some of the values of the functions f, g, f', g' are given in the following table.

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
0	1	1	5	1/3
1	3	-4	-1/3	-8/3

(a) If $h(x) = g(f(x))$, then $h'(0) =$ $-40/3$.

$$h'(x) = g'(f(x)) \cdot f'(x)$$

$$h'(0) = g'(f(0)) \cdot f'(0)$$

$$= g'(1) \cdot 5$$

$$= \left(-\frac{8}{3}\right)(5) = -\frac{40}{3}$$

(b) If $h(x) = \frac{f(x)}{g(x)+2}$, then $h'(1) =$ $13/6$.

$$h'(x) = \frac{f'(x)(g(x)+2) - f(x)g'(x)}{(g(x)+2)^2}$$

$$h'(1) = \frac{\left(-\frac{1}{3}\right)(-4+2) - (3)\left(-\frac{8}{3}\right)}{(-4+2)^2} = \frac{(2/3)+8}{4} = \frac{26/3}{4} = \frac{26}{12}$$

$$= \frac{13}{6}$$

(c) If $h(x) = \ln(f(x))$, then $h'(1) =$ $-1/9$.

$$h'(x) = \frac{1}{f(x)} \cdot f'(x)$$

$$h'(1) = \frac{1}{3} \cdot (-1/3) = -\frac{1}{9}$$