1. [8 points] The table below gives several values for the function f and its derivative f'. You may assume that f is invertible and differentiable.

w	-2	-1	0	1	2
$f(w)$	1	0	-2	-3	-5
$f'(w)$	-3	-1.5	-0.5	0	-4

For each of the parts below, find the exact value of the given quantity. If there is not enough information provided to find the value, write NOT ENOUGH INFO. If the value does not exist, write DOES NOT EXIST. You are not required to show your work on this problem. However, limited partial credit may be awarded based on work shown.

a. [2 points] Let $h(w) = \dfrac{f(w)}{6+w}$. Find $h'(-2)$.

Solution:

$$h'(w) = \frac{f'(w)(6+w) - f(w)\cdot 1}{(6+w)^2}$$

$$h'(-2) = \frac{(-3)\cdot(4) - 1}{4^2}$$

Answer: $h'(-2) = \dfrac{-13}{16} = -0.8125$

b. [2 points] Let $k(w) = 3^{f(2w)}$. Find $k'(-1)$.

Solution: $k'(w) = \ln(3)\cdot 3^{f(2w)}\cdot f'(2w)\cdot 2$

$k'(-1) = \ln(3)\cdot 3^{f(-2)}\cdot f'(-2)\cdot 2 = \ln(3)\cdot 3^1\cdot(-3)\cdot 2$

Answer: $k'(-1) = -18\ln(3)$

c. [2 points] Let $p(w) = f(f(-w+1))$. Find $p'(1)$.

Solution: $p'(w) = f'(f(-w+1))\cdot f'(-w+1)\cdot(-1)$

$p'(1) = f'(f(0))\cdot f'(0)\cdot(-1) = f'(-2)\cdot(-0.5)\cdot(-1) = (-3)\cdot(-0.5)\cdot(-1)$

Answer: $p'(1) = -\dfrac{3}{2}$

d. [2 points] Let $r(w) = w\cdot(f(w))^2$. Find $r'(2)$.

Solution: $r'(w) = 1\cdot(f(w))^2 + w\cdot 2\cdot f(w)\cdot f'(w)$

$r'(2) = 1\cdot(f(2))^2 + 2\cdot 2\cdot f(2)\cdot f'(2) = 1\cdot(-5)^2 + 2\cdot 2\cdot(-5)\cdot(-4)$

Answer: $r'(2) = 105$