Brief answer to selected problems in HW04

1. Section 3.5: Problem 58.

   For continuity, we can find $b = 1$, and $g'(x)$ is not differentiable at $x = 0$ since

   $$\lim_{x\to 0^+} g'(x) \neq \lim_{x\to 0^-} g'(x)$$

2. Hw04: Problem 3

   $$\frac{d}{dx} f(g(2)) = f'(g(2))g'(2) = 4 \times 0.1 = 0.4$$

3. Section 3.7: Problem 42.

   Using implicit differentiation to get

   $$\frac{dy}{dx} = \frac{y+2}{1-x}$$

   And normal parallel to the line $2x + y = 0$ lead us to solve the equations

   $$\begin{cases} \frac{y+2}{1-x} = \frac{1}{2} \\ xy + 2x - y = 0 \end{cases}$$

4. Section 3.7: Problem 48.

   Implicit differentiation gives us

   $$qy^{q-1}\frac{dy}{dx} = px^{p-1}$$

   By using $y = x^{\frac{p}{q}}$ to express $\frac{dy}{dx}$ leads to the result.