1 Fall 2017: Problem 6

6. a) $c_1 = 1, c_2 = 1$ OR $c_1 = \frac{1}{2}, c_2 = \frac{1}{2}$. (The rest of the answers below assume $c_1 = c_2 = 1$.)

   Explanation: For squared error, we don't penalize differently for over or underestimating, so $c_1 = c_2 = c$. Minimizing this loss is equivalent for whatever positive constant c we choose, though you will most often see c set to 1 or 1/2 (for cleanliness when differentiating). In lecture notes, we take the average squared loss so in that case $c_1 = c_2 = 1/2$.

   c) Assuming $c_1 = c_2 = 1$.

   $$\theta = \theta - 2\eta x(g - y) \begin{cases} c_1, & \text{if } g > y \\ c_2 & \text{o.w.} \end{cases}$$

   $$\theta_0 = \theta_0 - 2\eta(g - y) \begin{cases} c_1, & \text{if } g > y \\ c_2 & \text{o.w.} \end{cases}$$