ECE 302 Quiz 4
(10 points)

Name: Solution (3 points) 07/15/2016

1. A student rolls two fair dice. Let the random variables X and Y denote the value of the first and second roll, respectively. Assume the rolls are independent. **Show all work.**

   (a) (3 points) Find $p_{X,Y}(x_i, y_j)$. Indicate the values of x_i and y_j.

   (b) (2 points) Find $\mathbb{E}[XY]$.

   (c) (2 points) Find $\mathbb{E}[X/Y]$.

(a) $P_X(x_i) = 1/6$, $x_i = 1, 2, \dots, 6$

$P_Y(y_j) = 1/6$, $y_j = 1, 2, \dots, 6$

X, Y independent

$\Rightarrow P_{X,Y}(x_i, y_j) = P_X(x_i) P_Y(y_j)$

$= 1/36$, $x_i = 1, 2, \dots, 6$, $y_j = 1, 2, \dots, 6$

(b) X, Y independent $\Rightarrow E[XY] = E[X]\,E[Y]$

$= (7/2)^2$

$= \boxed{49/4}$

(c) X, Y independent $\Rightarrow E[X/Y] = E[X]\,E[1/Y]$

$E[1/Y] = \frac{1}{6}(1 + \frac{1}{2} + \dots + \frac{1}{6})$

$= 49/20$

$\Rightarrow E[X/Y] = \boxed{7/2 \cdot 49/20}$