Will May M11 HW

11.1

1.) a.) Range: 1-36

b.) $P(X=6)$: $\{(1,6),(2,3),(3,2),(6,1)\} = 4/36 = 1/9$

2.) a.) Range: 0-4

b.) $P(X=0) = \frac{\binom{4}{0}\binom{48}{5}}{\binom{52}{5}} = 0.6588$

$P(X=1) = \frac{\binom{4}{1}\binom{48}{4}}{\binom{52}{5}} = 0.2995$

$P(X=2) = \frac{\binom{4}{2}\binom{48}{3}}{\binom{52}{5}} = 0.0399$

$P(X=3) = \frac{\binom{4}{3}\binom{48}{2}}{\binom{52}{5}} = 0.0017$

$P(X=4) = \frac{\binom{4}{4}\binom{48}{1}}{\binom{52}{5}} = 0.00002$

3.) a.) Range: 0-2

b.) $P(G=0) = \frac{\binom{7}{0}\binom{3}{2}}{\binom{10}{2}} = \frac{1}{15}$

$P(G=1) = \frac{\binom{7}{1}\binom{3}{1}}{\binom{10}{2}} = \frac{7}{15}$

$P(G=2) = \frac{\binom{7}{2}\binom{3}{0}}{\binom{10}{2}} = \frac{7}{15}$

11.1 5.) a.) Range: {-10, -8, -6, -4, -2, 0, 2, 4, 6, 8, 10}

b.) $P(x=-10) = 0.000977$
$P(x=-8) = 0.009766$
$P(x=-6) = 0.043945$
$P(x=-4) = 0.117188$
$P(x=-2) = 0.205078$
$P(x=0) = 0.246094$
$P(x=2) = 0.205078$
$P(x=4) = 0.117188$
$P(x=6) = 0.043945$
$P(x=8) = 0.009766$
$P(x=10) = 0.000977$

11.2 1.) a.) $E[G] = \sum_{g=0}^{2} g \cdot P(g=g)$

$= 0 \cdot P(G=0) + 1 \cdot P(G=1) + 2 \cdot P(G=2)$
$= 0 \cdot \frac{1}{15} + 1 \cdot \frac{7}{15} + 2 \cdot \frac{7}{15}$
$= \boxed{1.40}$

2.) a.) $E[A] = 2\left(\frac{1}{6}\right) + 1\left(\frac{1}{6}\right) + (-1)\left(\frac{2}{3}\right)$
$= \frac{2}{6} + \frac{1}{6} - \frac{2}{3}$
$= -\frac{1}{6} = \boxed{-0.17}$ loses \$0.17

4.) a.) $E[X] = \frac{(1^2+2^2+3^2+4^2+5^2+6^2)}{6} = \boxed{15.167}$

b.) $E[Y] = 0^2(1/8) + 1^2(3/8) + 2^2(3/8) + 3^2(1/8) = 24/8 = \boxed{3}$

11.3

11.3 1.) a.) $E(x) = \frac{3248700}{2598960} = 1.25$

2.) a.) $E(F) = (7)(0.125) = 0.875$

4.) a.) $10 \times \frac{1}{10} = 1$

11.4 1.) a.) $P(x=2) = 0.1849$

b.) $P(X \geq 2) = 1 - [P(x=0) + P(x=1)] = 0.2642$

c.) $E[X] = np = 100 \times 0.01 = 1$

d.) $np = 50 \times 0.01 = 0.5 \times 2 = 1$

3.) a.) $P(x \leq 4) = P(x=0) + P(x=1) + P(x=2) + P(x=3)$
$= 0.1719$

b.) $P(x \geq 4) = 1 - P(x \leq 4)$
$= 1 - [P(x=0) + P(x=1) + P(x=2) + P(x=3)]$
$= 0.3504$