Answer Key

1.
- $Prob(X = 0) = \frac{5}{6} \cdot \frac{5}{6} = \frac{25}{36}$
- $Prob(X = 5) = C(2,1)(\frac{1}{6}) \cdot \frac{5}{6} = \frac{10}{36}$
- $Prob(X = 10) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$
- $E[X] = 0 \cdot \frac{25}{36} + 5 \cdot \frac{10}{36} + 10 \cdot \frac{1}{36}$
  $= \frac{60}{36}$
  ≈ 1.67

2. $E[X] = 0 \cdot Prob(X = 0) + 5 \cdot Prob(X = 5) + 25 \cdot Prob(X = 25)$
$= 0 \cdot \frac{25}{36} + 5 \cdot \frac{10}{36} + 25 \cdot \frac{1}{36}$
$= \frac{75}{36} \approx \$2.08$
You will win about 8 cents each time you play, over the long term.

3.
a. 2 or 3

b. AA or BB

c. $Prob(X = 2) = (2/3)^2 + (1/3)^2 = 5/9$

d. $Prob(X = 3) = \frac{4}{9}$

e. $E[X] = 2 \cdot Prob(X = 2) + 3 \cdot Prob(X = 3)$
$= 2(5/9) + 3(4/9) \qquad = (22/9) \approx 2.44$ games