(Answer all the questions)

1. For $f(x) = c(x + 1)^2$; $x = 0, 1, 2, ..., 10$, determine the constant c so that $f(x)$ satisfies the conditions of being *pmf* for a random variable X, and then depict *pmf* as **line graph** and **histogram**. **[10]**

2. In the gambling game craps, the player wins $\$1$, $\$2$ and $\$3$ with probabilities 0.3, 0.2 and 0.1, and loses $\$1$ with probability 0.4 for each $\$1$ bet. What is the **expected profit** of the game for the player? Also, **find** the **variance** of the profit. **[6]**

3. It is claimed that for a particular lottery, $\frac{1}{10}$ of the 50 million tickets will win a prize. What is the probability of winning **at least one** prize if you purchase 10 tickets. **[4]**