Question 1

Prob of Success = $P = 0.1$

Number of Attempts = $N = 6$

Number of Successes = $x = 2$.

$0.1^2(1-0.1)^{6-2}$

$0.01\,(0.9)^4$

$nCx = \frac{n!}{x!(n-x)} * 0.06561$

$15 * 0.006561$

$= 0.098415$

$= 9.84\%$

Question 2. - Whats the prob of killing at most three enemies out of Cix.

Prob of Success = $P = 0.1$

Number of Attempts = $N = 6$

Number of Success At most = $x = 3$.

$nCx \cdot p^x \cdot (1-p)^{n-x}$

$0.1^1(1-0.1)^{6-1}$

$= 0.1(0.9)^5$

$= 6 * 0.0059049$

$= 0.0354294.$

$= 35.4\%.$

3.

$0.1^3(1-0.1)^{6-3}$

$0.001\,(0.9)^3$

$nCx = \frac{n!}{x!(n-x)!} * 0.000729.$

$20 * 0.000729$

$= 0.01458$

$= 1.458\%$

Probability of 1 = 0.354294

Probability of 2 = 0.098415

Probability of 3 = 0.01458

Probability of 3 = 0.354294
0.098415
0.01458

$\overline{46.7289\%} = 46.73\%$

Question 3i - Whats the maximum number of enemies We Can kill With 90% probability

$nC_x \cdot p^x \cdot (1-p)^{n-x}$

$90\% = 0.1^x (1-0.1)^{6-x}$
$x > \text{Log}(0.1) / \text{Log}(0.9) = 21.85$
$x = \text{Log}_6 (21.85)^N$
$x = 1.7213$
$x = 1$ Enemy.

Question 3ii - Suppose there is only one enemy and two Success Shots Can kill the enemy. Each Shot has a 10% Chance of Success. How many times do you need to Shoots to kill with 80% prob

Shooting Success Rate $= 0.1\%$

$P = C_k \, p^k \, (1-p)^{n-k}$

$= \begin{cases} k = 0, \text{ you missed all chances} \\ p = 0.1 \end{cases}$

$C_n^0 \; 0.1^0 \; 0.9^n$
$= C_n^0 \, 0.9^n$

$n = 5, \; p = 0.59 \Rightarrow 1-p \approx 0.41$
$n = 6, \; p = 0.53 \Rightarrow 1-p \approx 0.43$
$n = 7, \; p = 0.48 \Rightarrow 1-p \approx 0.52$

7 Shots

$P(S)$ = Success on Every Attempt $= 10/100 = 0.1$
$P(F)$ Prob of failure $= 0.9$

$0.9^n = (1 - (80/170))$
or $0.9^n = 0.2$
$\text{Log}_{10} (0.9)^n = \text{Log}_{10} 0.2$
$n = (\text{Log}_{10} 0.2) / \text{Log}_{10} 0.9$
$n = 15.27$
$n = 15.$