一、(1)：$P($软权, 先罚胜$) = p^2\cdot(C_2^0(1-q)^2 + C_2^1(1-q)q) + C_2^1 p(1-p)\,C_2^0(1-q)^2$

$= p^2(1-q^2) + 2p(1-p)(1-q)^2$

$P($软权, 后罚胜$) = (1-p)^2(q^2 + C_2^1 q(1-q)) + C_2^1 p(1-p)\cdot q^2$

$= (2q-q^2)(1-p)^2 + 2p(1-p)q^2$

$P($软权, 打平$) = C_2^0(1-p)^2\,C_2^0(1-q)^2 + C_2^1 p(1-p)\,C_2^1 q(1-q) + p^2q^2$

$= (1-p)^2(1-q)^2 + 4pq(1-p)(1-q) + p^2q^2$

$P($折权, 先罚胜$) = pq((1-q)(1-p) + q(1-p) + (1-q)p) + [p(1-q)+q(1-p)](1-q)(1-p)$

$= pq(1-pq) + (p+q-2pq)(1-p)(1-q)$

$P($折权, 后罚胜$) = qp[p(1-q) + (1-p)q + (1-p)(1-q)] + [q(1-p)+p(1-q)](1-p)(1-q)$

$= pq(1-pq) + (p+q-2pq)(1-p)(1-q)$

$P($折权, 打平$) = (1-p)(1-q)\cdot(1-q)(1-p) + [p(1-q)+q(1-p)]\times[q(1-p)+p(1-q)] + pq\cdot qp$

$= (p+q-2pq)^2 + p^2q^2 + (1-p)^2(1-q)^2$

代入 $p=\frac{3}{4}$, $q=\frac{1}{3}$. 依次有 $P_1=0.3542$　$P_2=0.2222$　$P_3=0.4236$

$P_4=0.2847$　$P_5=0.2847$　$P_6=0.4306$

(2)：设 P_k 为第一轮先罚队在加赛 k 轮后获胜(软权规则)的概率：则 $P_1=p(1-q)$

$P_{k+1} = \sum_{i=1}^{k}(pq)^i[(1-p)(1-q)]^{k-i}\cdot p(1-q) = p(1-q)(1-p-q+2pq)^k$

故 $P($先罚胜$) = \sum_{k=1}^{\infty} P_k = \frac{p-pq}{p+q-2pq}$　同理：$P($后罚胜$) = \frac{q-pq}{p+q-2pq}$

同上. 设 P_k 为折权下. 先罚队在第 k 轮加赛后胜的概率：

$P_1 = q(1-p)$.　$P_{2k+1} = \sum_{i=1}^{2k}(pq)^i[(1-p)(1-q)]^{2k-i}\cdot q(1-p)$.　$P_{2k+2} = \sum_{i=1}^{2k+1}(pq)^i[(1-p)(1-q)]^{2k+1-i}\,p(1-q)$.

故 $P($先罚胜$) = \sum_{k=1}^{\infty}(P_{2k-1}+P_{2k}) = 1-p(1-q)$

从而 $P($后罚胜$) = p(1-q)$

二、(1)：设 $P_k(A)$ 表示 A在 A的第 k次进攻后胜利的概率.

$P_1(A) = \alpha+\beta$　$P_k(A) = \gamma^{2k-2}(\alpha+\beta)$. 故 $P(A$胜利$) = \sum_{k=1}^{\infty} P_k(A) = \frac{\alpha+\beta}{1-\gamma^2} = \frac{1}{1+\gamma}$

(2)：$P = \alpha+\beta a+\gamma b$

(2)：由(1)知. 从某时开始实行突然死亡法后. 该队胜的概率为 $\frac{\alpha+\beta}{1-\gamma^2} = \frac{1}{1+\gamma}$

则 $P(A) = \alpha+\beta[\gamma+\beta\cdot\frac{1}{1+\gamma}] + \gamma\cdot(1-\frac{1}{1+\gamma}) = \frac{1+\beta\gamma^2}{1+\gamma}$

显然有 $\frac{1+\beta\gamma^2}{1+\gamma} > \frac{1}{1+\gamma} > \frac{1}{2}$ [illegible] 故原赛制更好

[illegible]