John Kiyak

CS355

Homework 8

*There are three basketball players, A, B, and C. A takes 30 shots a game, with a shooting percentage of 70%. B takes 20 shots, hitting 60%, and C takes 10 shots, hitting 50%.*

*Regarding the series of shots as a binomial sequence of Bernoulli trials what is the probability the A hits 20 shots? 21 shots? 22 shots?*

*What is the probability that B hits 17 shots? 18 shots? 19 shots?*

*What is the probability that C hits 4 shots? 5 shots? 6 shots?*

*P(k successes in n trials) = (nk)pkqn−k(nk)pkqn−k*

*n = number of trials*

*k = number of successes*

*n – k = number of failures*

*p = probability of success in one trial*

*q = 1 – p = probability of failure in one trial*

*P(A) = .70 An = 30*

*P(B) = .60 Bn = 20*

*P(C) = .50 Cn = 10*

*P(Player A hits 20 shots):*

*(An C 20) \* (P(A)) ^20 \* (1-P(A))^(An - 20)*

*= 30 C 20 \* (.70)^20 \* (.30)^10*

*= 30045015 \* (4.71165 \* 10^-9)*

*= .14156*

*P(Player A hits 21 shots):*

*(An C 21) \* (P(A)) ^21 \* (1-P(A))^(An - 21)*

*= 30 C 21 \* (.70)^21 \* (.30)^9*

*= 14307150 \* (2.89\*10^-4)*

*= .15729*

*P(Player A hits 22 shots):*

*(An C 22) \* (P(A)) ^22 \* (1-P(A))^(An - 22)*

*= 30 C 22 \* (.70)^22 \* (.30)^8*

*= 5852925\* (2.565\*10^-8)*

*= .15014*

*P(Player B hits 17 shots):*

*(Bn C 17) \* (P(B)) ^17 \* (1-P(A))^(Bn - 17)*

*= 20 C 17 \* (.60)^17 \* (.40)^3*

*= 1140 \* .00001083*

*= .01234*

*P(Player B hits 18 shots):*

*(Bn C 18) \* (P(B)) ^18 \* (1-P(A))^(Bn - 18)*

*= 20 C 18 \* (.60)^18 \* (.40)^2*

*= 190 \* .0000162*

*= .003087*

*P(Player B hits 19 shots):*

*(Bn C 19) \* (P(B)) ^19 \* (1-P(A))^(Bn - 19)*

*= 20 C 19 \* (.60)^19 \* (.40)^1*

*= 20 \* .00002437*

*= .000487*

*P(Player C hits 4 shots):*

*(Cn C 4) \* (P(C)) ^4 \* (1-P(A))^(Cn - 4)*

*= 10 C 4 \* (.50)^4 \* (.50)^6*

*= 210 \* .000976*

*= ..20507*

*P(Player C hits 5 shots):*

*(Cn C 5) \* (P(C)) ^5 \* (1-P(A))^(Cn - 5)*

*= 10 C 5 \* (.50)^5 \* (.50)^5*

*= 252 \* .000976*

*= .246093*

*P(Player C hits 6 shots):*

*(Cn C 6) \* (P(C)) ^6 \* (1-P(A))^(Cn - 6)*

*= 10 C 6 \* (.50)^6 \* (.50)^4*

*= 210 \* .000976*

*= .2051*