Question \#72633, Math / Statistics and Probability
Solution: Let X be the random variable denoting number of college seniors who disapprove of smoking pot daily from the sample of 12 .
So, clearly X ~Binomial (12, 0.7).
The probability that the number of people who disapprove of smoking pot daily is
a) Anywhere from 7 to 9

Required probability is $\mathrm{P}(\mathrm{X}=7)+\mathrm{P}(\mathrm{X}=8)+\mathrm{P}(\mathrm{X}=9)$
$={ }^{12} \mathrm{C}_{7}{ }^{*}(0.7)^{7 *}(0.3)^{5}+{ }^{12} \mathrm{C}_{8}{ }^{*}(0.7)^{8 *}(0.3)^{4}+{ }^{12} \mathrm{C}_{9}{ }^{*}(0.7)^{9 *}(0.3)^{3}$.
b) At most 5

Required probability is $P(X=0)+P(X=1)+P(X=2)+P(X=3)+P(X=4)+$ $P(X=5)$
$=(0.3)^{12}+{ }^{12} \mathrm{C}_{1}{ }^{*}(0.7)^{*}(0.3)^{11}+{ }^{12} \mathrm{C}_{2}{ }^{*}(0.7)^{2 *}(0.3)^{10}+{ }^{12} \mathrm{C}_{3}{ }^{*}(0.7)^{3 *}(0.3)^{9}$ $+{ }^{12} \mathrm{C}_{4}{ }^{*}(0.7)^{4 *}(0.3)^{8}+{ }^{12} \mathrm{C}_{5}{ }^{*}(0.7)^{5 *}(0.3)^{7}$.
c) Not less than 8

Required probability is $P(X=12)+P(X=11)+P(X=10)+P(X=9)+$ $\mathrm{P}(\mathrm{X}=8)$
$=(0.7)^{12}+{ }^{12} \mathrm{C}_{11^{*}}(0.3)^{*}(0.7)^{11}+{ }^{12} \mathrm{C}_{10}{ }^{*}(0.3)^{2 *}(0.7)^{10}+{ }^{12} \mathrm{C}_{9}{ }^{*}(0.3)^{3 *}(0.7)^{9}$ $+{ }^{12} \mathrm{C}_{8}{ }^{*}(0.3)^{4 *}(0.7)^{8}$.

