Question #18841 We have a box with 8 green marbles, 5 red marbles, and 7 blue marbles. We choos 3 marbles from the box at random without looking. What is the probablity that they will all be green? What is the probability they will all be blue? What is the probability they will all be red or they will all be blue? What is the probability that they will all be the same color?

Solution. Using classical definition of probability one can get that (number of ways of choosing 3 marbles $\binom{20}{3}$).

a) $\dfrac{\binom{8}{3}}{\binom{20}{3}} = \dfrac{56}{1140}$.

b) $\dfrac{\binom{7}{3}}{\binom{20}{3}} = \dfrac{35}{1140}$.

c) $\dfrac{\binom{5}{3}}{\binom{20}{3}} + \dfrac{\binom{7}{3}}{\binom{20}{3}} = \dfrac{35+10}{1140} = \dfrac{45}{1140}$.

d) $\dfrac{\binom{8}{3}}{\binom{20}{3}} + \dfrac{\binom{7}{3}}{\binom{20}{3}} + \dfrac{\binom{5}{3}}{\binom{20}{3}} = \dfrac{56+35+10}{1140} = \dfrac{101}{1140}$.