

Problem 7.

1 pair:

$$\frac{\binom{13}{1} \binom{4}{2} \binom{12}{2} \binom{4}{1} \binom{4}{1}}{\binom{52}{4}} = \frac{1,098,248}{2,707,250} = 0.405$$

$$2: \frac{\binom{13}{2} \binom{4}{2} \binom{4}{2} \binom{11}{1} \binom{4}{2}}{\binom{52}{4}} = \frac{123,552}{270,725} = 0.45$$

$$3: \frac{\binom{13}{1} \binom{4}{3} \binom{12}{2} \binom{4}{1} \binom{4}{1}}{\binom{52}{4}} = \frac{54,912}{270,725} = 0.2$$