MTH 451 Quiz 2

Evan Fox (efox20@uri.edu)

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Question 1.

(a) This question is the same as asking out of 24 objects how many 3 permutations are there? It is a permutation question because order matters, then we have $24P3 = \frac{24!}{21!} = 12,144$.

(b) Since this time all three winners receive the same award, it becomes a question about combinations. Then want the number of ways to choose 3 out of 24 or $\binom{24}{3} = 2,024$.

Question 2.

The number of ways of selecting 2 boys out of 7 is given by $\binom{7}{2}$ and the number of ways to select 3 girls out of ten is $\binom{10}{3}$. To find the total number of ways we need to multiply these values together since for each way of choosing the boys there are $\binom{10}{3}$ ways of choosing the girls. So we get

$$\binom{10}{3} \times \binom{7}{2} = 120 \times 21 = 2,520$$

different ways.

Question 3.

Let S denote the sample space, then $|S| = \binom{26}{3}$. Since we want the chance that none are in Tampa there are $\binom{14}{3}$ ways to do it, so

$$P(E) = \frac{\binom{14}{3}}{\binom{26}{3}} = 14\%$$

Question 4.

Let S denote the sample space. Then $|S| = \binom{20}{5}$. We want to know the probability of getting 2 red balls and 3 white. Given that there are 5 and 7 red and white balls respectively, we have that the total number of ways of choosing 2 red and 3 white is

$$\binom{5}{2} \times \binom{7}{3}$$

Then since $P(E) = \frac{|E|}{|S|}$ we get

$$P(E) = \frac{\binom{5}{2} \times \binom{7}{3}}{\binom{20}{5}} = 0.022\%$$