

## Probability Homework Answers

### A. With Replacement

Given: 3 red and 2 yellow marbles (Total = 5), drawing 3 times with replacement.

i. Possible outcomes (Tree Diagram):

RRR, RRY, RYR, RYY, YRR, YRY, YYR, YYY

ii. Probability of exactly two red marbles:

$$P = 3 * (3/5 * 3/5 * 2/5) = 54/125$$

iii. Probability of at least one yellow marble:

$$P = 1 - (3/5)^3 = 98/125$$

iv. Probability of all marbles same color:

$$P = (3/5)^3 + (2/5)^3 = 27/125 + 8/125 = 35/125$$

### B. Without Replacement

Given: 3 red and 2 yellow marbles (Total = 5), drawing 3 times without replacement.

ii. Probability of exactly two red marbles:

$$P = P(RRY) + P(RYR) + P(YRR) = 3 * (3/5 * 2/4 * 2/3) = 36/60 = 3/5$$

iii. Probability of at least one yellow marble:

$$P = 1 - P(RRR) = 1 - (3/5 * 2/4 * 1/3) = 9/10$$

iv. Probability of no yellow marbles:

$$P = 3/5 * 2/4 * 1/3 = 1/10$$

### C. Based on the frequency table:

1.  $P(\text{Woman}) = 30/50 = 3/5$

2.  $P(\text{Sports}) = 16/50 = 8/25$

3.  $P(\text{Man and TV}) = 8/50 = 4/25$

4.  $P(\text{Dance}) = 18/50 = 9/25$

5.  $P(\text{Woman} \mid \text{TV}) = 8/16 = 1/2$