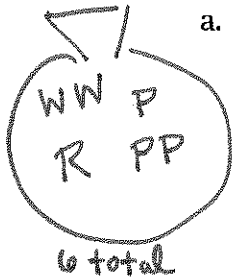


Hwk_5- Choosing Marbles

1. A bag contains two white blocks, one red block and three purple blocks. You choose one block from the bag.



- a. Find each probability.

$$P(\text{white}) = \frac{2}{6} = \frac{1}{3}$$

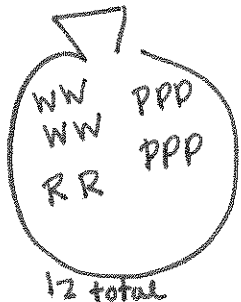
$$P(\text{red}) = \frac{1}{6}$$

$$P(\text{purple}) = \frac{3}{6} = \frac{1}{2}$$

- b. What is the probability of NOT choosing a white block?

$$P(\text{not white}) = \frac{4}{6} = \boxed{\frac{2}{3}}$$

- c. Suppose the number of blocks of each color is doubled. What happens to the probability of choosing each color?



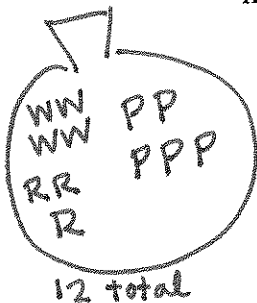
$$P(\text{white}) = \frac{4}{12} = \frac{1}{3}$$

$$P(\text{red}) = \frac{2}{12} = \frac{1}{6}$$

$$P(\text{purple}) = \frac{6}{12} = \frac{1}{2}$$

The probabilities stay the same.

- d. Suppose you add two more blocks of each color to the ORIGINAL bag. What happens to the probability of choosing each color?



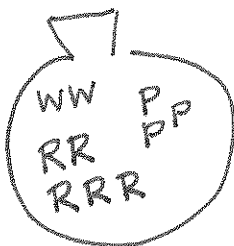
$$P(\text{white}) = \frac{4}{12} = \frac{1}{3}$$

$$P(\text{red}) = \frac{3}{12} = \frac{1}{4}$$

$$P(\text{purple}) = \frac{5}{12}$$

The probability of choosing each color changed.

- e. How many blocks of which colors should you add to the original bag to make the probability of choosing a red block equal to $\frac{1}{2}$?



You would want to add 4 red blocks to the original bag. This would give you 5 red blocks total out of 10 blocks all together in the bag.

$$P(\text{red}) = \frac{5}{10} = \frac{1}{2}$$

2. A bag contains several marbles. Some are red, some are white, and some are blue. You count the marbles and find the theoretical probability of choosing red marble is $\frac{1}{5}$. You also find the theoretical probability of choosing a white marble is $\frac{3}{10}$.

$$P(\text{red}) = \frac{1}{5} \quad P(\text{white}) = \frac{3}{10} \quad P(\text{blue}) = \frac{5}{10}$$

- a. What is the least number of marbles that can be in the bag?

There must be at least 10 marbles in the bag.

- b. Can the bag contain 60 marbles? If so, how many of each color does it contain?

$$\text{Red: } \frac{1}{5} \times 60 = 12 \quad \text{white: } \frac{3}{10} \times 60 = 18 \quad \text{Blue} = \frac{5}{10} \times 60 = 30$$

Yes the bag could contain 60 marbles

- c. How can you find the probability of choosing a blue marble?

You can add the other two probabilities together

$$\frac{1}{5} + \frac{3}{10} = \frac{5}{10} \quad \text{and then subtract from 1.}$$

The probability of choosing a blue is $\frac{5}{10}$ or $\frac{1}{2}$.

3. Decide whether each statement is true or false. Justify your answers.

- a. The probability of an outcome can be 0.

True. This would mean the outcome is impossible.
ex: rolling a 7 on a # cube.

- b. The probability of an outcome can be 1.

True. The outcomes must be absolutely certain.

ex: rolling a # less than 7 on a # cube.

- c. The probability of an outcome can be greater than 1.

False. All probabilities are between

0 (impossible) and 1 (absolutely certain)