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Probability with Compound Events (Independent and Dependent)

Compound Events refer to 2 or more events occurring.
To find the probability of **compound events,** multiply the probability of each of the events together.

Ex. 1: Suppose you have a bag containing 2 black marbles and 3 red marbles. You reach into the bag, select a marble, see what color it is and replace it in the bag (Event #1). Then you repeat this process (Event #2). What is the probability of picking a red marble both times?

$P(\text{red, red}) = \frac{3 \text{ red}}{5 \text{ Total}} \times \frac{3 \text{ red}}{5 \text{ Total}} = \frac{9}{25}$ or 36%

Event one Event two w/ Replacement

* These are Independent Events *

Since the first marble was **replaced** back in the bag before the second marble was drawn, the probability of the second drawing is **independent** of the probability of the first drawing. These are referred to **as independent events** --- in other words, the outcome of one event does not affect the outcome of the other event.

Ex. 2: Suppose you have a bag containing 2 black marbles and 3 red marbles. You reach into the bag, select a marble, see what color it is but **do not replace it** in the bag (Event #1). Then you reach in and select another marble. (Event #2). What is the probability of picking a red marble both times?

$P(\text{red, red}) = \frac{3 \text{ red}}{5 \text{ Total}} \times \frac{2 \text{ red}}{4 \text{ Total}} = \frac{6}{20}$ or 30%

Event one Event two w/ No replacement

* These are Dependent Events *

*** An **Independent Event** occurs with **replacement.**
A **Dependent Event** occurs **without replacement.**