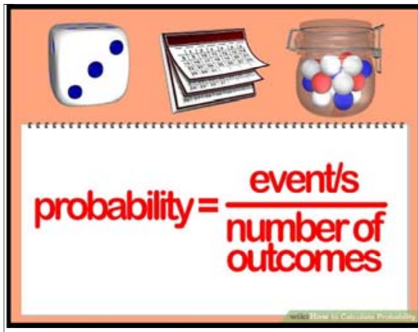
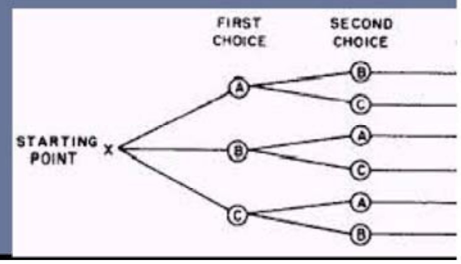



## 5.10 Conditional Probability

Dependent events: events whose outcomes are affected by each other

Conditional probability: probability of an event occurring given that another event has already occurred.

Ex.)Jackie plays on a volleyball team called the Giants. The Giants are in a round-robin tournament with five other teams. The teams that they will play against will be selected at random and they will play each team once. Determine the probability that their first game will be against the Clippers and their second game will be against the Rams. From your formula sheet, we can use:

$$P(A \cap B) = P(A) \times P(B \mid A)$$

"given"

$$P(C \cap R) = P(C) \times P(R \mid C)$$

prob. of playing Clippers AND Rams

prob. of Clippers

prob. play Rams GIVEN you already played Clippers

$$= \frac{1}{5} \times \frac{1}{4} = \boxed{\frac{1}{20}} = \boxed{5\%}$$


Ex.) A computer manufacturer knows that, in a box of 100 chips, 3 will be defective. Jocelyn will draw 2 chips, at random, from the box of 100 chips. We want to determine the probability as a percent that Jocelyn will draw 2 defective chips.

$$P(A \cap B) = P(A) \times P(B|A)$$

$$= \frac{3}{100} \times \frac{2}{99} = \frac{6}{9900} = \boxed{0.06\%}$$

$\div 100 = .91$ $.42$

Ex.) According to a survey, 91% of Canadians own a cellphone. Of these people, 42% have a smartphone. Determine, to the nearest percent, the probability that any Canadian you met during the month in which the survey was conducted would have a smartphone.

$$P(C \cap S) = P(C) \times P(S|C)$$

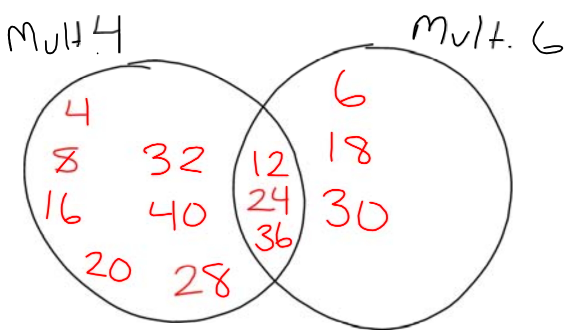
$$= .91 \times .42$$

$$= \frac{91}{100} \times \frac{42}{100}$$

$$= \boxed{38\%}$$


Ex.) Nathan asks Riley to choose a number between 1 and 40 and then say one fact about the number. Riley says that the number he chose is a multiple of 4. Determine the probability that the number is also a multiple of 6.

a) Venn Diagram




$\frac{3}{10} = \boxed{30\%}$

1 2 3 4 5
6 7 8 9 10
11 12 13 14 15
16 17 18 19 20
21 22 23 24 25
26 27 28 29 30
31 32 33 34 35
36 37 38 39 40

b) Formula: $\frac{P(A \cap B)}{P(A)} = \frac{\cancel{P(A)} \times P(B|A)}{\cancel{P(A)}}$

$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

$$= \frac{\left(\frac{3}{40}\right)}{\left(\frac{10}{40}\right)} = (3 \div 40) \div (10 \div 40) = \boxed{\frac{3}{10}}$$


Ex.) Hillary is the coach of a junior ultimate team. Based on the team's record, it has a 0.6 chance of winning on sunny days and 0.7 chance of winning on rainy days. Tomorrow, there is a 0.4 chance of rain. There are no ties in ultimate. What is the probability that Hillary's team will win tomorrow?

Win Sunny OR Rainy Win

+

$P(S \cap W) + P(W \cap R)$

$P(S) \times P(W|S) + P(R) \times P(W|R)$

$(0.60 \times 0.60) + (0.40 \times 0.70)$

$= 0.64 = 64\% = \frac{16}{25}$

Pg. 188 # 1, 4, 5, 7, 9, 16.

May 31-1:11 PM