The probability that I eat a Peanut Butter & Jelly sandwich today is 90%. The probability that I drink a Coke today is 85%. Find the following probability as a percent rounded to the nearest hundredth.

These events are NOT mutually exclusive.

P(eat PB&J (or) drink Coke) =

$$90\% + 85\% - (.90)(85)$$
$$= 98.50\%$$

The probability that you are on time for your appointment is 62%.
The probability that you are not on time for your appointment is 38%.
Find the following probability as a percent.

P(on time or not on time) = $62\% + 38\% = 100\%$

What is true about these two events?
- These events are Mutually Exclusive.
- These are the only two possible outcomes
- Together they equal 100% probability.

When two mutually exclusive event make up all possible outcomes they are called COMPLIMENTARY EVENTS.

When I come home tonight the probability that it is dark is $\frac{3}{7}$.

Find the following probability.

P(when I come home it is light) = $\frac{7-3}{7}$ = $\frac{4}{7}$

State the complimentary event to the following probability:

P(Roller Coaster)

Complimentary Event: P(Not Roller Coaster)

State the complementary event to this:

Event: elephant

Complementary Event is:
Not elephant

Find P(not elephant) = $\dfrac{75-13}{75} = \dfrac{62}{75}$

Given: P(elephant) = $\dfrac{13}{75}$

If your parents tell you this:

I will let you use the car under one condition....

What does it mean?

The are placing some kind of restriction on you

Section 12-2: Conditional Probability

	Snickers	Reeses	KitKat	Skittles	Total
Male	18	32	28	13	91
Female	20	29	19	22	90
Total	38	61	47	35	181

What is the probability that the next person you select likes Reeses under the one condition you must select a female?

$= \dfrac{29}{90}$

of those 90 females only 29 chose Reeses

there are only 90 females

Conditional Probability:

Probability that has a restriction limiting the sample space. (# of total outcomes)

$P(B \mid A)$: "The probability of B given condition A must be true."

"Probability of B given A"

symbol for a conditional probability

Conditional Probability Formula:

$$P(B \mid A) = \frac{P(A \text{ and } B)}{P(A)}$$

Independent Events → $\dfrac{P(A) \cdot P(B)}{P(A)}$

Dependent Events → $\dfrac{P(A) \cdot P(B \text{ after } A)}{P(A)}$

When A and B are independent $P(B \mid A)$ is really just $P(B)$

Use the definition of conditional probability to find P(own a pet | female)

Do you own a pet?

$$P(B \mid A) = \frac{P(A \text{ and } B)}{P(A)}$$

	Yes	No
Female	8	6
Male	5	7

P(own a pet | female)

$$P(B \mid A) = \frac{P(A \text{ and } B)}{P(A)} = \frac{\frac{8}{26}}{\frac{14}{26}} = \frac{8}{14}$$

	Snickers	Reeses	KitKat	Skittles	Total
Male	18	32	28	13	91
Female	20	29	19	22	90
Total	38	61	47	35	181

Find each conditional probability. Give answer as a fraction.

1. $P(\text{Male} \mid \text{Reeses}) = \dfrac{32}{61}$

2. $P(\text{KitKat} \mid \text{Female}) = \dfrac{19}{90}$

Find each probability as a percent rounded to the nearest tenth.

Municipal Waste Collected (millions of tons)

Material	Recycled	Not Recycled
Paper	36.7	45.1
Metal	6.3	11.9
Glass	2.4	10.1
Plastic	1.4	24.0
Other	21.2	70.1

= 18.2

SOURCE: U.S. Environmental Protection Agency.

1. P(Paper | Recycled)

$$\frac{36.7}{68} = 54.0\%$$

68

2. P(Not Recycled | Metal)

$$\frac{11.9}{18.2} = 65.4\%$$

Find each probability as a fraction.

	Cartoon	Action	Mystery	
Child	55	15	6	76
Adult	12	28	31	71
	67	43	37	147

1. P(Cartoon | Adult) = $\frac{12}{71}$

only adults

2. P(Child | Action) = $\frac{15}{43}$

only those who like action

3. P(Mystery and Adult) = $31/147$

out of all 147

4. P(Action or Cartoon) = $110/147$

out of all 147