If your parents tell you this:

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

What does it mean?

They 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?

$= \frac{29}{90}$

the condition, or restriction, in the problem affects the total number of outcomes (the denominator).

Conditional Probability:

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

P(B | A): "The probability of B given condition A must be true." or "Probability of B given A"

	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(Male | Reeses) = $\frac{32}{61}$

2. P(KitKat | Female) = $\frac{19}{90}$

The vertical lines that indicate you are dealing with a conditional probability already look like a fraction bar. If you think of them as a fraction bar then the first item leads to the numerator of the probability and the second item leads to the denominator of the probability.

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

SOURCE: U.S. Environmental Protection Agency.

1. P(Paper | Recycled)

$= \frac{36.7}{68.0} = 54.0\%$

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) = $\frac{12}{71}$

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

3. P(Mystery and Adult) = $\frac{31}{147}$

4. P(Action or Cartoon) = $\frac{110}{147}$ $\quad 43 + 67$

#'s 3 and 4 don't have the vertical line, therefore, they are NOT conditional probabilities.

You can now finish Hwk #30

Sec 12-2

Due tomorrow

Pages 656

Problems 1-8, 25-27

Section 9-7: Probability of Multiple Events

Independent Events:
When the outcome of the first event does NOT affect the outcome of the second event.

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

Dependent Events:
When the outcome of the first event DOES affect the outcome of the second event.

$P(A \text{ and } B) = P(A) \bullet P(B \text{ after } A)$

this means that the second probability will be altered because of the what happened first. How it's affected depends on what is going on in the particular problem you are working on.

Is each pair of event *Dependent* or *Independent* ?

1. Spinning a spinner and pulling a number out of a hat. INDEP
2. You open the refrigerator and randomly grab a drink and finish it. You then reach in and randomly grab another drink and finish that one. DEP
3. Having your i-pod randomly play two songs, one after the other, assuming songs can repeat. INDEP
4. You take a can of spray paint from the shelf use it up then take another can and use it up. DEP

You flip a coin then roll a die. Find this probability as a fraction:

P(Flip Heads and then roll a 5) = $\frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12}$

This is an example of Independent Events:
When the outcome of the first event does not affect the outcome of the second event.

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

$\frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12}$

In a jar are 4 grape suckers and 6 cherry suckers.

1. Find the probability that if you randomly grab a sucker it is Cherry.

$\frac{6}{10}$ → 6 of the suckers are cherry

→ there are 10 suckers to choose from

2. Assuming that you ate the first one you took, what is the probability that the second one you take is Grape?

$\frac{4}{9}$ → all four grape are still in the jar

→ one of the suckers has been removed

3. If you ate the second one too what it the probability that the third one you take is also Grape?

$\frac{3}{8}$ → there is one less grape left in the jar

→ another sucker has been removed

2. Assuming that you ate the first one you took, what is the probability that the second one you take is Grape?

3. If you ate the second one too what it the probability that the third one you take is also Grape?

These last two questions are examples of Dependent Events.

When the outcome of the first event DOES affect the outcome of the second event.

$P(A \text{ and } B) = P(A) \bullet P(B \text{ after } A)$