Friday, May 29, 2020

Conditional Probability

This lesson begins the material for the next (and last) Practice Sheet which you will be given on Monday.

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

What does it mean?

They are placing some kind of restriction on you which puts limits on what you can do.

Conditional Probability

these probabilities are very similar to the ones we've already worked on except there will be some conditions given that will restrict the total # of outcomes.

Below are the results of a survey:

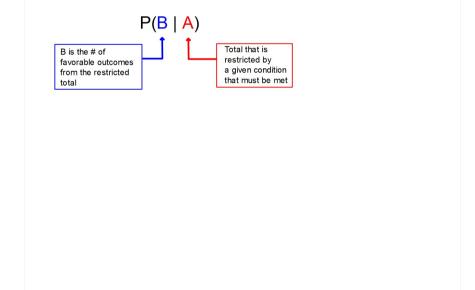|	Snickers	Reeses	KitKat	Skittles	Total
Male	18	32	28	13	91
Female	20	29	19	22	90
Total	38	61	47	35	181

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

If you must select a female then you should focus only on that row.

This means that the total # of outcomes is only the 90 females.

The favorable # of outcomes is then the 29 females who chose Reeses.

P (Reeses given they must be a female) = $\dfrac{29}{90}$

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."

"Probability of B given A"

$$P(B \mid A)$$

B is the # of favorable outcomes from the restricted total

Total that is restricted by a given condition that must be met

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	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) = $\dfrac{32}{61}$

Restrictions on total # of outcomes (denominator)

# of favorable outcomes within that restriction (numerator)

	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.

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

Restrictions on total # of outcomes (denominator)

# of favorable outcomes within that restriction (numerator)

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.

Total = 68

1. P(Paper | Recycled)

= $\dfrac{36.7}{68}$

= 54.0 %

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.

Total = 18.2

2. P(Not Recycled | Metal)

= $\dfrac{11.9}{18.2}$

= 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) = $\dfrac{12}{71}$ 2. P(Child | Action) = $\dfrac{15}{43}$

Pay attention to the question, these next two are NOT Conditional Probabilities!

3. P(Mystery and Adult) = $\dfrac{31}{147}$ 4. P(Action or Cartoon) = $\dfrac{67+43}{147} = \dfrac{110}{147}$

This lesson will lead into Practice #30
which I'm still working on. I'll have it available
by Monday, at the latest.