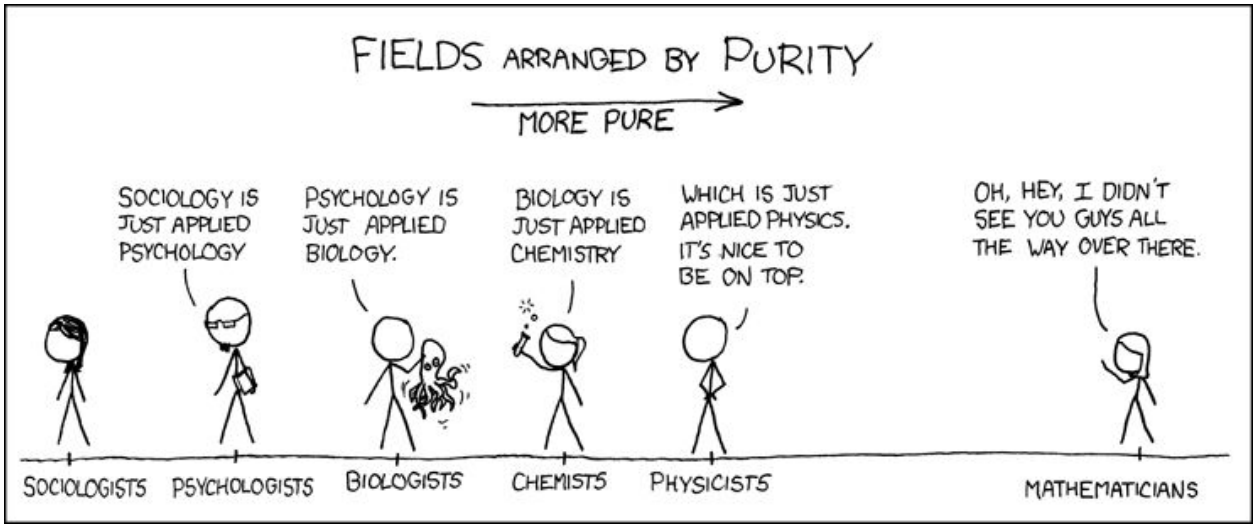
Inductive Reasoning

Math is a way of thinking. It is a way to view everything from a lens of absolute truth. It is the most rational of all fields of study.



XKCD.com/435

Original mathematicians were all philosophers. This became astronomy. This became mathematics.

Philosophy spends a great deal of time with how to think and that pitfalls that we all come across when trying to think. We are biased and wrong. It is hard to accept and harder to identify.

Math is an argument. It is making claims and proving those claims to be infallibly true.

All gibs are trips. Also, all flaps are gibs. Therefore all flaps are trips.

Is this true?

All students named Johnny got 50% on my last math test. Therefore if you got 50% on my last math test your name is Johnny.

Is this true?

Inductive Reasoning

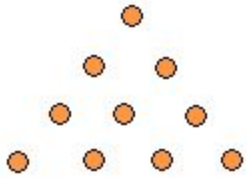
...refers to reasoning that takes specific information and makes a broader generalization that is considered probable, allowing for the fact that the conclusion may not be accurate.

Some examples:

- ➔ Jennifer leaves for school at 7 am. Jennifer is always on time. Jennifer assumes that she will always be on time if she leaves at 7 am.
- ➔ Bob is showing a diamond ring to John. Bob has told John that he intends to marry Susan. Bob has bought the ring to give to Susan.
- ➔ The chair in the living room in red. The chair in the dining room is red. The chair in the bedroom is red. All chairs in the house are red.
- ➔ Mike just moved here from Vancouver. Mike has red hair. Therefore all people in Vancouver have red hair.

Look carefully at the following figures. Use *inductive reasoning* to make a *conjecture* about the next figure:

Let's try another:



This is what is done when we take measurements. We look for trends and attempt to make reasonable conclusions.

Here is the weather data for Barriere for the last 30 years (temp is always recorded on a rolling 30 year scale)

Temperature:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Daily Average (°C)	-6.5	-2.6	3	8.1	12.7	16.5	19	18.4	13.2	6.5	-0.2	-5.1		A
Standard Deviation	4.1	3.1	1.8	1.3	1.4	1.4	1.2	1.4	1.5	0.9	2.7	3.3		A
Daily Maximum (°C)	-2.7	2.2	9.6	15.9	20.7	24.4	27.9	27.1	21.3	12.3	3.2	-1.9		A
Daily Minimum (°C)	-10.2	-7.3	-3.7	0.2	4.7	8.5	10.1	9.6	5.1	0.6	-3.6	-8.2		A
Extreme Maximum (°C)	14	15.5	24	32.2	38	39.4	**41.1**	38.9	34.5	27.5	21.7	12.2		
Date (yyyy/dd)	1989/30	1986/25	1994/30	1977/25	1983/29	1958/23	**1956/19**	1965/01+	1988/05	1980/07+	1975/03+	1976/16		
Extreme Minimum (°C)	**-42.8**	-34.4	-29.4	-11.7	-4.4	-1.1	0.6	-2.2	-7	-20	-33	-39.4		
Date (yyyy/dd)	**1957/24**	1956/15	1976/03	1972/03+	1962/05	1965/22	1956/29	1973/19	1983/29	1984/31	1985/27	1968/30		
Precipitation:														
Rainfall (mm)	11.3	12.1	20.4	26.1	41.6	51.8	47.6	45.8	33.4	34.8	28.8	11.6	365.1	A
Snowfall (cm)	33.3	19.6	4.9	0.6	0.1	0	0	0	0	1.7	21	39.9	121.1	A
Precipitation (mm)	44.6	31.7	25.3	26.7	41.7	51.8	47.6	45.8	33.4	36.5	49.7	51.5	486.2	A
Average Snow Depth (cm)	24	25	8	0	0	0	0	0	0	0		12		D
Median Snow Depth (cm)	24	25	7	0	0	0	0	0	0	0		11		D
Snow Depth at Month-end (cm)	27	19	1	0	0	0	0	0	0	1	5	21	6	D
Extreme Daily Rainfall (mm)	20.3	30.2	14.2	24.6	23.9	**48.8**	43.7	42.2	23.6	23.6	28.6	20.4		
Date (yyyy/dd)	1971/29	1977/11	1995/23	1988/23	1972/21	**1982/30**	1977/28	1976/16	1986/23	1967/29	1992/06	1982/02		
Extreme Daily Snowfall (cm)	25.2	19.4	7.9	6.6	1.2	0	0	0	0	9.7	**30.2**	22.1		
Date (yyyy/dd)	1982/07	1986/15	1964/03	1966/11	1989/23	1957/01+	1957/01+	1956/01+	1956/01+	1971/31	**1977/25**	1971/04		
Extreme Daily Precipitation (mm)	25.2	30.2	21.2	24.6	23.9	**48.8**	43.7	42.2	23.6	23.6	30.2	22.1		
Date (yyyy/dd)	1982/07	1977/11	1995/23	1988/23	1972/21	**1982/30**	1977/28	1976/16	1986/23	1967/29	1977/25	1971/04		
Extreme Snow Depth (cm)	**66**	60	44	16	0	0	0	0	0	9	29	46		
Date (yyyy/dd)	**1982/24**	1982/14	1982/01	1982/01	1981/01+	1981/01+	1981/01+	1980/01+	1981/01+	1991/31	1991/05	1992/22		

https://eldoradoweather.com/canada/climate2/Barriere.html

Example 3: Page 9

Key Idea:

Inductive reasoning involves looking at specific examples. By observing patterns and identifying properties in these examples, you may be able to make a general conclusion, which you can state as a conjecture.

Need to Know:

- ➔ A conjecture is based on evidence you have gathered
- ➔ More support for a conjecture strengthens the conjecture, but does not prove it.

Assigned Work:
Pg 12 #1, 3, 6-8, 10, 13, 15-17
Also "Math in Action" pg 15