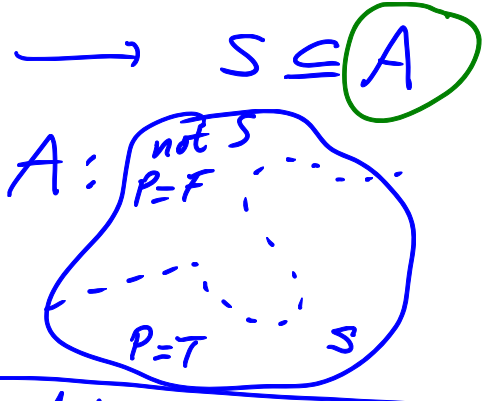
Functions: $f: A \to B$

Monday: "allow f to be undefined for some elements in A" — fine in general but

Now: I take it back! in this course we aim to be precise, so domain A will always be everywhere that f is defined.

Predicates vs subsets $\longrightarrow$ $S \subseteq A$

↳ $P: A \to \{T, F\}$



Summation & Product Notation

Eg: $\frac{2^2}{2\cdot 3} + \frac{3^2}{3\cdot 3} + \frac{4^2}{4\cdot 3} + \cdots + \frac{n^2}{n\cdot 3}$

$$\sum_{j=2}^{n} \frac{j^2}{j\cdot 3} =$$

$$\sum_{j=2}^{2} \frac{j^2}{j-3} = \frac{2^2}{2-3}$$ one term

$$\sum_{j=2}^{1} \frac{j^2}{j-3}$$ end ① start ②

$\frac{2^2}{2-3} + \frac{1^2}{1-3}$ ✕ want fixed step +1

undefined ✕ makes identities merry

in between: +1

0 — identity for + ($0+x=x$)

Product:

$$\prod_{i=1}^{3} \frac{i-1}{i^2} = \left(\frac{1-1}{1^2}\right)\left(\frac{2-1}{2^2}\right)\left(\frac{3-1}{3^2}\right)$$

$$\prod_{i=2}^{1} \frac{i-1}{i^2} = 1$$

General properties & identities — see notes!

Propositional Logic

proposition: any statement that is True or False

- it is sunny outside
- there is intelligent life on Jupiter
- How are you?

Def: a flangld is a pink umbrella, not already defined

- $x > 42$ — is a proposition
  - also a predicate

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propositional variables & operators

p, q, r, s — stand for propositions

negation (NOT) $\neg$ ($\sim$ $\overline{p}$)

$\neg p$ $\neg$(it is sunny outside)

Truth table:

possible values of variables (one per row)

p	$\neg p$
F	T
T	F

values of the expression (formula)

- conjunction (AND) $\wedge$
- disjunction (OR) $\vee$
- implication (if ... then) $\Rightarrow$
- bi-implication (if and only if) $\Leftrightarrow$

check the notes for examples and truth tables.

next week: more on implication