Dec 5th

Sets

A set is a collection of things called elements. A set is denoted two ways: explicitly: C= {1, 4, q, Dennis, α}, D= {4.7, π, "The", {4, 7, 10}, Dennis}
with set builder notation: i.e. {x|P(x) is true} then P(x) is some predicate taking x as the variable

Eg: E= $\{x| x^2 = 4\}$ = {2, -2}
F= { π| π has 4 elements and 4 cycles} = {(12)(24), (13)(24), (14)(23), (1)(234), (1)(243), (2)(134), (2)(143), (3)(124), (3)(142), (4)(123), (4)(132)}
(In each case, the universe of discourse is the obvious one: Real #'s and permutations on the set {1, 2, 3,4 } resp.)

We usually name sets with capital letters
E.g. A= $\{x| x^2 = 4\}$
B= {y| y > 0}

If A is a set then we denote by |A| the number of elements in A, also called the cardinality of A.
|C| = 5 |D| = 5 |E| = 2 |F| = 11

Def: if x is an element of set A then we write x ε A.
T/F (12)(34) ε F = T
T/F (21)(43) ε F = T
T/F (12)(3)(4) ε F = F
T/F 3 ε $\{y| y^2 > y^2-1\}$ U of D |R

Some sets of numbers you must know and love(optional)
|R = real #'s = {x| x is on th e# line} (i.e every number in sight)
|Z = integers = {...-2, -1, 0, 1, 2,...}
|Q = rationals = $\{^a/_b|$ a ε |Z, b ε |Z, b != 0}
|N = natural = {0, 1, 2, 3,...}
|C = complex