Expressions

- **Simplify, perform indicated operations, ...**
- **Factoring**
  - Greatest Common factor
  - Count Terms
    - 4 terms, factor by grouping
    - 3 terms, factor by thinking inside out foil
    - 2 terms, difference of squares, then diffierence/sum of cubes
      - cubes
        - SOAP
        - LL LR RR
        - Trinomial factor is prime
      - Sum of squares is prime
- **Rational**
  - Add fractions
    - Common denominator
  - Multiply/divide
    - Invert divide fractions, factor everything and reduce factors of one
  - Simplify Complex Fractions
    - One fraction in numerator, one in denominator, and invert and multiply denominator
    - Multiply all terms in numerator and denominator by LCD of all mini denominators
  - Divide polynomials
    - Divide by monomial
      - Split up fraction and simplify each term
    - Divide by non-monomial
      - Long division (don't forget placeholders)
- **Radical**
  - Simplify
    - Pull out groups (three in a cubed root, etc)
  - Add/Subtract
    - Like terms are same root, same radicand(under root)
  - Multiply
    - Distribute, foil, same as always.
    - Numbers inside root multiply together if same index
    - Numbers outside root multiply together
    - If different index, use rational exponent form
  - Divide
    - Quotient rule
      - Same index
  - Rationalize Denominator
    - If monomial denominator, multiply by radical over radical, giving denominator what is necessary to simplify out of radical
    - if binomial denominator, multiply top and bottom by conjugate of denominator
- **Exponent Rules**
  - a^0=1
  - (ab)^x = a^x*b^x
  - (a/b)^x = a^x / b^x
  - (a^x)^y = a^(xy)
  - a^x*a^y = a^(x+y)
  - a^x / a^y = a^(x-y)
  - a^(-1) = 1/a
  - a^(1/3) = cube root of a, a^(1/2) = square root of a, ...
- **Complex Numbers**
  - i=sqrt(-1)
  - i^2=-1
  - Convert square roots of negative numbers into i form immediately
  - Add/subtract like terms
  - Multiply by distributing or foiling
  - Dividing
    - Denominator is imaginary (bi)
      - Multiply by i on top and bottom
    - Denominator is full complex (a+bi)
      - Multiply by conjugate on top and bottom
  - Higher powers of i:
    - They go in a cycle of 1, i, -1, -i
    - Divide power by 4 and the remainder tells you where in the sequence it is
- **Log and Exponentials**
  - Convert or Rewrite from one form to the other
    - for a log, big base both sides
    - for an exponential, log both sides