Test #4 Concepts (Ch. 4, Ch. 5.5-5.7, Ch. 6)

Solving System of Linear Inequalities w/ Absolute Values Included (§4.4)

Graph each inequality

Make sure absolute values are 2 parts

$<$ or $\leq$ is intersection & $>$ or $\geq$ is union

Shade overlap

Know how to find intersection of boundary lines

Solving equations & Inequalities w/ Absolute Values (§4.3)

Always **2** parts!

Get absolute value inequality number & split into 2 parts using endpoint & opposite

Example: $2|x + 3| - 5 > 3$

Step 1: $2|x + 3| > 8$ then $|x + 3| > 4$ Step 2: $x + 3 < -4$ or $x + 3 > 4$ Step 3: Solve both parts

$<$ or $\leq$ is intersection & $>$ or $\geq$ is union

Graph, Interval & Set Builder Notation of Solution

Factoring

Previous Strategies

- GCF (§5.3)
  - Only Factor Method
  - As a first step
- By Grouping (§5.3)
- Trinomials (§5.4-5.5)
  - Perfect Square Trinomial (5.5)
  - Leading Coefficient 1 (5.4)
  - Leading Coefficient not 1 (5.4)
    - ✓ By Grouping(5.4)
  - By Substitution
    - ✓ To factor higher degree than second
    - ✓ To factor with quadratic form
- Binomials (§5.5)
  - Difference of 2 Perfect Squares $a^2 - b^2$ = (root of 1st + root of 2nd)(root of 1st – root of 2nd)
  - Sum of 2 Perfect Squares – Prime
- Sum of Cubes $a^3 + b^3$ ➔ a is cube root of a^3 & b is cube root of b^3: $(a + b)(a^2 - ab + b^2)$
- Difference of Cubes $a^3 - b^3$ ➔ a is cube root of a^3 & b is cube root of b^3: $(a - b)(a^2 + ab + b^2)$
- New Strategies (§5.5)
  - Perfect Square Trinomial Minus Perfect Square $a^2 \pm 2ab + b^2 - c^2$
    - ✓ Two steps: Step1: Factor Perfect Square Trinomial into binomial squared
      Step 2: Use substitution to factor difference of Squares

Solving Polynomial Equations (§5.7& §8.2)

- Zero Factor Property
  - Standard Form, Factor, Set Factors Containing Variable = 0 & solve
- X-Intercepts of a 2nd & 3rd Degree Equations
  - Application of solving quadratic. Roots are x-coordinate for x-intercepts
- Pythagorean Theorem
  - $a^2 + b^2 = c^2$ is relationship between the lengths of the sides of a right triangle
  - use methods of solving quadratic equations to find solutions for application problems
  - remember extraneous roots (solutions that aren't valid) arise from such problems
- Use of Function Notation
  - If f(x) is a polynomial, P(x), then finding the values of x that make P(x) = # is solving a quadratic equation
- Parabolic Motion
  - An object's motion when it is thrown, launched, etc. can be described using a quadratic.
  - The height at time t is what the equation describes.
  - Setting the function equal to zero, finding P(x) = 0, finds the time it will take for the object to reach the ground.
  - If asked to find time to reach the ground solve a quadratic!

Rational Expressions & Equations (Ch. 6)

- Finding the Domain of a Rational Expression (§6.1)
  - Also called: Finding restrictions or finding the zeros or finding where it is undefined
  - Set denominator equal to zero, solve equation & eliminate the values from the domain
- Simplifying a Rational Expression (§6.1)
  - NO CANCELING in ADDITION!! Factor before canceling!
  - Factor numerator & denominator & cancel
    - ✓ Don't forget GCF is factoring too!
    - ✓ See Factoring Strategies in Ch. 5
- Multiply/Divide Rational Expressions (§6.1)
  - Factor and cancel in multiplication
  - If division make sure to take reciprocal of divisor (2nd poly.) and multiply by dividend (1st poly.) then multiply
- Adding/Subtracting Rational Expressions (§6.2)
  - Find an LCD
    - ✓ Factor denominators, "unique factors" to HIGHEST exponent (not sum of all exponents)
  - Build higher terms
    - ✓ Multiply numerator by what's missing – EXPAND it out
  - Distribute subtraction across polynomial of subtrahend (poly. after subtraction symbol)
  - Add numerators, and carry along LCD
  - Factor numerator & cancel if possible to simplify
- Complex Fractions (§6.3)
  - Find LCD of ALL denominators of all terms in the complex fraction
  - Multiply all terms by LCD, CANCEL & expand is needed, then see steps for simplifying a rational expression
- Division of Polynomials (§6.4 & §6.5)
  - Dividing by a MONOMIAL – NOT using long division; break into terms, with each term in num. over denom.
  - Dividing by Polynomial
    - ✓ Long Division
      - Like #'s – Divide, multiply, subtract, bring down
      - Be careful of the binomial & subtraction
      - Write remainders over divisor & ADD them to quotient
    - ✓ Synthetic Division
      - Only when divisor is 1st degree w/ no leading coefficient (x – c)
      - Divisor must read: x – c
      - c | a b c d e and then bring down a and multiply by c to go under b, & continue the pattern
      - Answer is one degree less than original terms
- Remainder Theorem (§6.5)
  - If P(x) is a polynomial, then the remainder of P(x) ÷ (x – c) is the same as P(c)
- Solving Equations (§6.6)
  - Use LCD of denominators to clear
  - Find restrictions
  - 2 types of equations can result from clearing – Linear vs Quadratic (or higher)

  Decide how to solve and solve
  - Always compare solutions to restrictions before answering
- Solving Equations for a Single Variable (§6.7)
  - Variables in denominator this time around
    - ✓ Clear 1st & proceed as in previous chapters
    - ✓ Factoring may occur too, if YOUR variable is in TWO terms, group those terms & factor to solve
- Variation Problems (§6.8)
  - Direct, Indirect/Inverse, Joint & Compound
  - Modeling using variation

This is a maybe depending on our coverage today, 4/19

- Applications (§6.7)
  - Translation problems AGAIN (just with reciprocals)
  - Distance problems AGAIN
  - Work Problems (just like distance)
    - ✓ $R = {}^{1}/_{\text{totatl time}}$ & equation W = RT,
      - Time is individual
    - ✓ Solve with $W_1 + W_2 = 1$, since work contributed by each individual gets the WHOLE job done