Chapter 1 TIP SHEET

1. Remember the Rules of Exponents—especially when to add them and when to multiply them.
2. Be able to handle negative exponents and fractional exponents
3. Be able to factor. **First** factor out the Greatest Common Factor.
4. If trial and error is too cumbersome to factor a trinomial, use the **ac** method.
5. When there are four terms, factor by grouping.
6. After each "factoring" look at all factors to determine if any of them can still be factored.
7. Memorize the formulas for difference of squares, difference of cubes and sum of cubes. Remember you cannot factor the sum of squares.
8. Be able to add, subtract, multiply and divide polynomials.
9. When doing long division, both divisor and dividend should be in decreasing powers of the variable. All missing powers should be inserted with a coefficient of zero.
10. Simplify radicals before combining.
11. Know how to convert radicals to fractional exponents.
12. Rationalize one term denominators by multiply **both** numerator and denominator by a radical that will result in the denominator being a perfect square or cube or whatever gets rid of the radical.
13. Rationalize two term denominators by multiplying **both** the numerator and the denominator by the conjugate of the **denominator**.
14. In an addition/subtraction problem, if in the denominator the variable of the highest degree is negative (e.g. 3-x or -x+2), multiply both the numerator and the denominator by negative one.
15. In a multiplication/division problem, if in the numerator or the denominator the variable with the highest degree is negative (e.g. 3-x or -x+2), factor out a negative one from that numerator/denominator.

By FAILING to PREPARE,

you are PREPARING to FAIL

Test 2 Tip Sheet (corresponding Test Review problem)

1. Remember **minus a negative** term equals a positive term $-(-x) = +x$ (1)
2. **Zero** is an acceptable solution to a problem (easy to check)
3. Make sure all denominators are in **descending powers** of variable $x / 3-x = -x / x-3$
4. When multiplying a rational equation by the LCD, make sure to multiply **all terms** by the LCD (3, 4)
5. Throw out any solution that makes a **denominator equal to zero**. (4)
6. **Isolate** one radical; **square** both sides. Use foil on the other side.
   If there is a second radical, then isolate it and square both sides again. (5, 6)
7. **Simplify** all radicals in answer
8. **Check** answers to radical problems to look for extraneous solutions (5, 6)
9. Absolute value
   a. = set inside equal to the number and also to the negative of the number $x = a$ or $x = -a$ (7)
   b. < inside is **between** negative of the number and the number $-a < x < a$ (11)
   c. > inside is less than negative of the number **or** greater than the number $x < -a$ or $x > a$ (12)
10. When multiplying or dividing by a negative number, **reverse** the inequality sign (8)
11. Express solutions in **interval notation** and **graph** when asked to do so (8, 9, 10)
12. If equation is a **contradiction**—no solution. If equation is **always true** – all real numbers $[-\infty , +\infty]$ (28c)
13. Use **sample points** to solve rational inequalities. Make sure zero is on the right side of the inequality (9, 10)
14. For **distance** problems, use the formula: Distance = Rate X Time. (13)
    a. Rate is **adjusted** (for wind/current) rate of vehicle.
    b. Distance and times are **additive**
    c. Distance is the same for both legs of a **round trip**
15. For **mixture** problems the formula is: Amount of Concentrate = Percent X Volume. (14)
    a. Amount of Concentrate and Volumes are **additive** and their sums are what's in the mixture
    b. **Amount of Mixture Concentration** is usually the basis for an equation
16. To solve distance and mixture problems use a **chart**: (13, 14)
    a. Put given **data** into chart and **calculate** other entries from this data
    b. Assign a **variable** and make more **calculations** using the variable.
    c. Look for a relationship and form an **equation**. Solve for everything that is asked.
17. For **work** problems, learn formula and be consistent with time units (15)
18. Learn midpoint and distance **formulas** (18, 19, 20)
19. Center of circle is the **midpoint** of any of its diameters (21)
20. Radius is **distance** from center to any point on circle (21)
21. Learn slope **formula** and use two points to find slope. Be consistent with points 1 & 2. (17)
22. Slope of **horizontal** line is zero ($y = a$). Slope of **vertical** line is undefined ($x = a$). (22)
23. To **graph** an equation, find any two points—either intercepts or other points that avoid fractions.
    Or, find one point and use the slope to find a second point. You can check with a third point to make sure that it falls on your line. (24)
24. Learn **point slope** form of a line equation. Use slope and any point. (16b, 17)
25. Learn **slope intercept** form of a line equation. Uses slope(m) and y-intercept (b) but both can be determined by solving the equation for y. ($y = mx + b$) (16a, 23)
26. To put an equation in standard/general form, $Ax + By = C$, multiply by LCD to get rid of denominator and then move terms around.
27. **Parallel** lines have the same slope. The slopes of **perpendicular** lines are negative reciprocals. (25, 26, 27)
28. To solve a system of equations using **substitution**, solve for a variable with a coefficient of one. (28a, 28c)

29. To solve a system of equations by **elimination**, put both equations in standard form. When multiplying an equation by a factor, be sure to multiply every term. Solve for both variables. (28)

Chapter 3 TIP SHEET

16. Commit the formulas to memory
17. When solving a quadratic equation, use the specified method
18. Remember x=0 is an acceptable solution.
19. Quadratic formula
    a. Make sure equation is in standard form (= 0)
    b. Be mindful of the sign of "-b"
    c. Look at the signs of "a" and "c" and make sure that the sign under the radical is correct after inserting values
20. Square root principle—roots are plus **and** minus. Cube roots are either positive **or** negative.
21. Discriminant
    a. Double check the sign in between terms
    b. Know the significance of the sign of the discriminant
22. Know how to complete the square. Make sure that the coefficient of the "squared" term is one.
23. Be able to determine the quadratic equation if you are given the roots.
24. When looking at a graph of a parabola
    a. Know how to determine if discriminant is positive, negative or zero
    b. Know how to determine the sign of the coefficient "a"
25. Remember that when "i" is squared it equals negative one
26. To get the "i" out of the denominator, multiply numerator and denominator by the conjugate of the denominator. New denominator will be "a" squared **plus** "b" squared.
27. Include complex solutions and write them in the form a + bi or a - bi.
28. Use substitution when the exponent of the first term is double the exponent of the second term. Make sure you solve for the **original** variable.
29. Clear rational equations of fractions by multiplying all terms by the lowest common denominator. Eliminate any solution that makes any denominator in the original problem equal to zero.
30. Isolate terms with radicals one at a time and **carefully** square both sides of equation. Check answers
31. For quadratic inequalities, right side should be zero. Factor, set factors equal to zero and then use sample points.
32. Know the inequality (sign) characteristics of quadratics with double roots (one root) and complex roots.
33. If you cannot factor an expression, use the ac method or quadratic formula to find roots.
34. Use interval notation and graph solutions when asked.
35. When graphing on the number line, darken the line and clearly show if end points are included.
36. Motion – equations will be provided; know how to use them
37. For motion problems
    a. velocity (v) at highest point is zero   b. height (y) on ground is zero   c. throw out negative times (t<0)
38. From standard equation of a parabola / Axis of symmetry – careful with the sign. Use axis (x) to find vertex (x,y).
39. When graphing a parabola, use a dotted line for the axis of symmetry and label all points
40. From the graph of a parabola, be able to determine the sign of the discriminant (positive, negative or zero) and the sign of the coefficient "a." Be able to match parabola graphs with equations.
41. Standard equation of a circle
    a. Know the relationship between signs in equation and signs of the coordinates of the center of the circle.
    b. Remember the number on the right side of the equals sign is the radius **squared**

42. The midpoint of any diameter is the center of the circle. The length of the radius is one-half that of the diameter.
43. Use completing the squares to go from the general form of a circle to the standard form.
44. When graphing a circle, start at center and count out the radius in four directions to get points on the circle.
45. Know how to set up perimeter / area problems