~ **Problems 1 – 4**

 \*Order of Operations: **GEMDAS**

 Grouping Symbols (including absolute value, radicals, parentheses, etc.)

 Exponents

 Multiplication/Division in Order of Appearance

 Addition/Subtraction in Order of Appearance

 \*Remember **absolute value** is the distance a number is from zero, so once you simplify inside the absolute value bars, make the final value **positive** when you drop the bars!

**~ Problems 5 – 10**

 \* **Axis of Symmetry:** is given by the equation **x =** 

 This line is also halfway between the x-intercepts.

 \* **Vertex:** is on the axis of symmetry (and is also known as the maximum or minimum value)

 Substitute in the x-value of the axis of symmetry to the function to find the output, or y-value of the vertex

 \* **Maximum/Minimum:**

 - If a is **positive**, the parabola opens **up**, thus having a **minimum** value at the

 **y-coordinate** of the vertex.

 - If a is **negative**, the parabola **opens down**, thus having a **maximum** value at the

 **y-coordinate** of the vertex.

 <https://www.youtube.com/watch?v=8fXo31u9zOY>

**~ Problems 11 & 12**

 \* **x-intercepts** occur when the value of **y is zero**. You can **factor** and set each factor equal to zero to find these points, OR use the **quadratic formula** to find these points. If the discriminant, b2 – 4ac, is negative, you will end up with a negative number under the radical when applying the quadratic formula, thus resulting in imaginary roots, and therefore NO x-intercepts (the graph will never cross the x-axis).

 <https://www.youtube.com/watch?v=MqIpwRD-bLA>

**~ Problems 13 and 14**

 - Simplify distribute in any signs to the parentheses, drop the parentheses, and **combine like terms**. Terms must have the exact same variable to the exact same exponent in order to be like. For example, 3x2yand -4x2y are like terms, but 3x2y and -4xy2 are not.

 <https://www.youtube.com/watch?v=T0a92gEDukY>

**~ Problem 15**

 Don’t let four terms throw you for a loop, when you have four terms form two groups!

 **(Factor by grouping)**

<https://www.youtube.com/watch?v=rR4FfB-FZJw>

**~ Problem 16**

 **\***Factor normally, but remember that the first terms must multiply to x8.

 \*Example: If the first term in the trinomial were x12, the first terms in your binomials would be x6 because x6 \* x6 = (x \* x \* x \* x \* x \* x) \* (x \* x \* x \* x \* x \* x), which is x12

 \*Don’t forget to look for differences of squares! In those cases, you can factor into:

(square root of the first + square root of the second)(square root of the first – square root of the second)

 Example: x2 – 49 = (x – 7)(x + 7)

 But remember x2 **+** 49 = (x – 7**i**)(x + 7**i**) since i2 is -1.

 <https://www.youtube.com/watch?v=jmbg-DKWuc4>

**~ Problems 17 and 18**

 \*Set each factor equal to zero and solve.

 \*Remember to take both the positive and negative square root if square rooting both sides of an equation.

 \*You may need to use the quadratic formula if you have a trinomial that you cannot factor further.

**~ Problems 19 and 20**

 Remember these terms from class…



**~ Problems 21 and 22**

 Discriminant is b2 – 4ac, which is under the radical in the quadratic formula.

 Square root of a positive results in two real solutions.

 Square root of a negative results in two imaginary solutions.

 Square root of 0 results in one real solution, since +√0 is the same as -√0.

 <https://www.khanacademy.org/math/algebra/quadratics/solving-quadratics-using-the-quadratic-formula/v/quadratic-formula-3>