Algebra II Final Exam Topics

1. **Absolute Value**

Ex. 1: $|3x+2|=13$ Ex. 2: $|x-5|>4$

2. **Systems of Equations**

Ex. 1: Solve for *x* using substitution: $\begin{aligned} y &= 2x+1 \\ 3x-2y &= -4 \end{aligned}$

Ex. 2: Solve for *y* using elimination: $\begin{aligned} 2x-6y &= 4 \\ 3x-3y &= 12 \end{aligned}$

Ex. 3: Solve this system of equations for *z*: $\begin{aligned} 2x+3y-z &= 6 \\ -x+5y-4z &= -6 \\ x-2y+2z &= 5 \end{aligned}$

3. **Graph Systems of Inequalities**

Ex. 1: Graph the system of inequalities: $\begin{aligned} x &< 2 \\ y &> -3 \\ y &< 2x+1 \end{aligned}$ (or match the graph with the inequalities)

4. **Polynomials**

Ex. 1: Add, subtract, multiply polynomials like: $(2x^2-3x+5)+(2x-5)$, $(2x^2-3x+5)-(2x-5)$, $(2x^2-3x+5)(2x-5)$

Ex. 2: Factor polynomials like x^2-81, $x^2+8x+12$, $4x^2+8x-21$, x^3-27, x^3+1

Ex. 3: Long Division: $x-4\overline{)x^3+3x^2-5x+4}$

5. **Quadratics**

Ex. 1: Solve quadratic equations using factoring, completing the square or the quadratic formula.

$x^2-7x+10=0$ $x^2-6x+\square=3+\square$ $3x^2-5x+2=0$

Ex. 2: Graphing Quadratic equations:

a. Match graph with equation b. Find vertex c. Find Line of symmetry
d. Write equation in vertex form or standard form based on a graph
e. Find *x*-intercepts based on a graph or an equation.
f. Find *y*-intercept of a parabola.

6. **Complex Numbers**: (Remember: $i^2=-1$)

Ex.1: $(2+3i)(3-5i)$ Ex. 2: $(5+2i)+(4-3i)$ Ex. 3: $(4-3i)-(5-5i)$

Ex. 4: Find the conjugate: $(2+3i)(?)=13$ Ex. 5: Plot $-5+3i$ on the complex plane.

7. **Functions:** Let $f(x)=3x+1$ $g(x)=x^2$ $h(x)=5-x^2$

Ex. 1: $h(-3)=$ Ex. 2: $f(x)-h(x)=$ Ex. 3: $h(x)+g(x)=$

Ex. 4: $f(x)\bullet g(x)=$ Ex. 5: $g\big(f(x)\big)=$ Ex. 6: $f^{-1}(x)=$